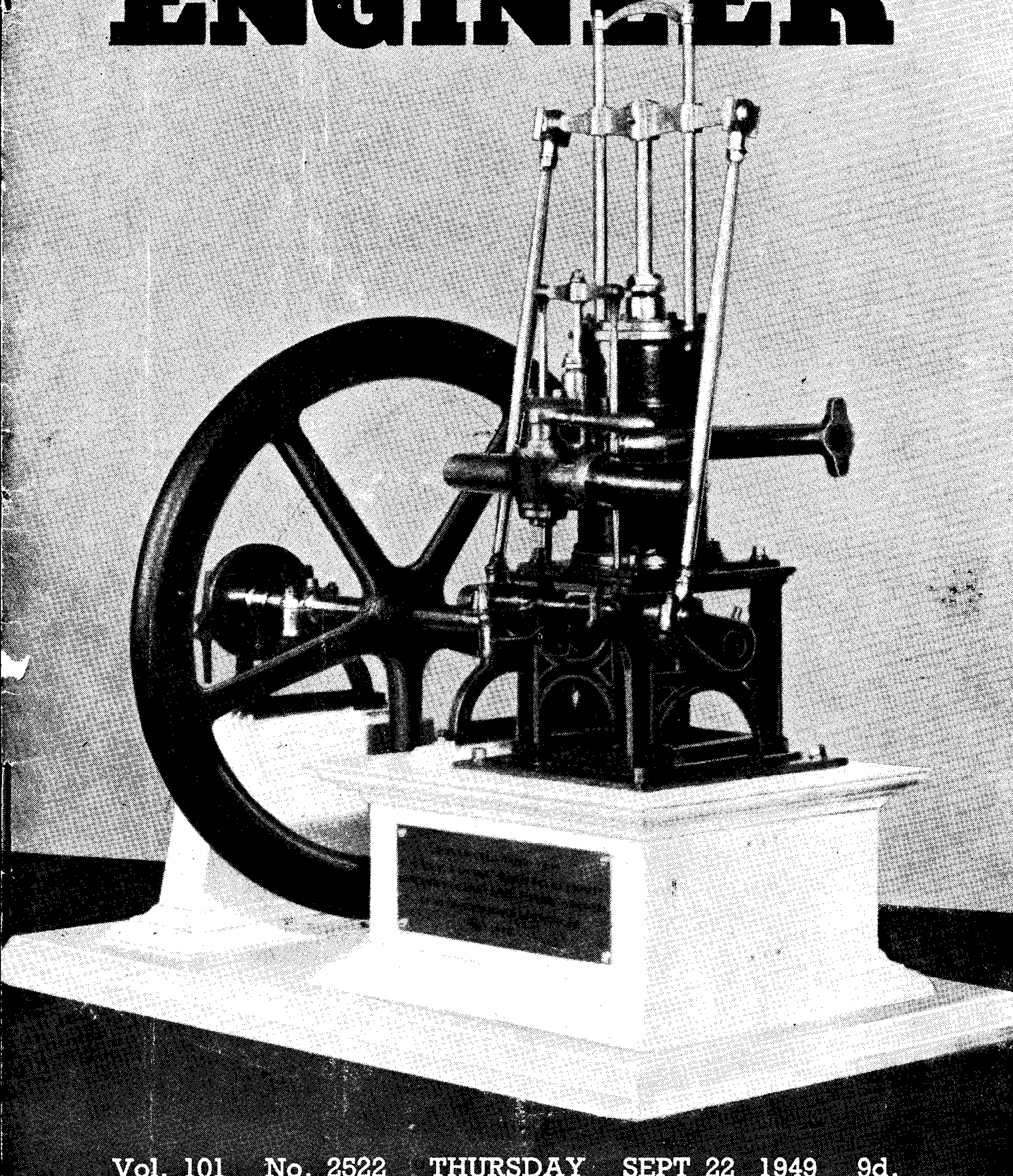
THE MODEL ENGINEER



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The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

22ND SEPTEMBER 1949 VOL. 101 NO. 2522

SMOKE RINGS

Our Cover Picture

● THE MODEL depicted on our cover this week is of interest in that it is now well over 100 years old. It has been carefully looked after, however, and is in excellent condition, as our photograph shows. It was built about 1830 by Robert S. Charsley, pioneer railway engineer, while he was at Oxford University, and is typical of the table-engines which were in fairly common use at that period.

Mr. Charsley's grandson, Mr. Keith Charsley, has lately presented this fine model to the Society of Model and Experimental Engineers, on whose stand at the "M.E." Exhibition it was seen working on compressed air. It appeared to attract a great deal of attention from visitors, many of whom had probably never heard of, to say nothing of having *seen*, a table-engine before.

The "M.E." Exhibition Layout

● THE MODIFICATIONS which were made to the general layout of the "M.E." Exhibition this year, as compared with previous years, were duly noted by most visitors, and seem to have achieved the desired results. The gangways were wider, and there was consequently less congestion at certain points. The position of the Grand Circular Track, nearer the middle of the hall and with a broad gangway nearly all round it, tended to induce much better circulation of the crowds.

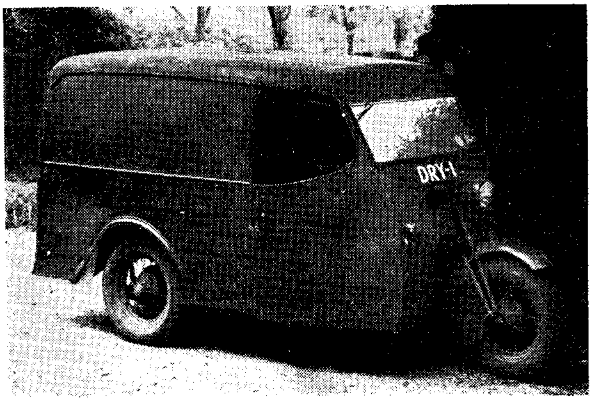
The positioning of the Competition Exhibits along one side of the hall, away from all other attractions, enabled visitors to inspect the entries in comparative peace. The provision of a guard-rail in front of the Competition stands rendered the models safe from damage likely to be caused by the fingers of small boys and other over-exhuberant onlookers. Moreover, the space between the rail and the stands enabled the judges to carry out their task in comfort; as a consequence, the judging was completed in less time than usual.

The space available for the competition models was probably greater than ever before; but many of this year's entries were of large size, and a certain amount of crowding was, therefore, apparent, though this effect would probably have been worse on the old arrangement.

An Exhibition Absentee

● THE INCLUSION of a photograph of Mr. H. Richardson's 5-in. gauge G.W.R. 4-6-0, *Toddington Grange*, in our "'M.E.' Exhibition" article in the August 25th issue, has led to a number of enquiries reaching Mr. Richardson and ourselves. We would like to make it clear that the engine itself was not at the show, but its photograph was an entry in the Photographic Competition, all the entries for which were displayed in the rest room throughout the period of the exhibition.

What's in a Registration Number?



● THE USE of the three-letter code for the registration of motor vehicles has sometimes produced amusing effects; but we doubt if a more diverting combination of letters and figures than the one seen in our illustration could be found anywhere.

The van, which consists of a body built on to a chassis and a Riley engine, does not belong to a brewer, but to a radio and television service engineer in a Berkshire village. We had often met this van on surrounding country roads before we managed to catch it with our camera, and we print its portrait because we think many readers will be amused by its distinctive registration.

Incidentally, DRY is a Leicestershire registration, and is not very often seen in Berkshire.

British Model Power Boat Successes

● WE HAVE just received a postcard from Mr. G. Stone, of the Malden Society of Model Engineers, who was the sole British representative in the International Regatta at Geneva on August 20th and 21st; he informs us that his boat *Lady Babs II* won the international race for 10-c.c. boats at a speed of 68.21 m.p.h., and that his "second string" *Rodney* came in fourth at 58.7 m.p.h. A new European record was set up, presumably by *Lady Babs II*, at a speed of 70.8 m.p.h. At the International Regatta held at Knocke on August 7th and 8th, Mr. W. H. T. Meageen was the sole British representative with his 20-c.c. ("A" class) boat *Samuel*, and in this case also, first place was secured. We understand that the speeds in the actual race were rather low, but a speed of 52 m.p.h. was obtained at a demonstration run. These successes show that Britain is still capable of holding her own in model speedboat competitions, and we have reason to believe, on the strength of recent reports, that outstanding successes have also been obtained by British competitors in other model sporting events.

Opening of the Hayes Track

● MR. R. W. NASH, hon. press secretary of the Hayes and Harlington Model Engineers Society, has sent us an account of the opening of the new track. The society's President, Mr. C. E. Shackle, driving a 5-in. gauge 0-4-0 saddle-tank engine named *Punch*, made the first trip round the 434-ft. circuit, on the afternoon of Saturday, August 27th; thereafter, until 8.30 p.m., the track was in continuous use, and more than one thousand passengers were carried.

The locomotives used, in addition to *Punch*, were: A 5-in. gauge 0-6-0 which, at present, has no tender and carries supplies of fuel and water in tin cans on the driving-truck; 3½-in. gauge G.W.R. "Dean" 0-6-0; L.N.E.R. "Green Arrow" 2-6-2, a "Hielan' Lassie," and an inside-cylinder Midland 4-4-0; 2½-in. gauge "Southern Maid" 0-6-0. All these contributed to a most enjoyable afternoon and evening.

An Insurance Suggestion

● WITH REFERENCE to the note published in our issue for June 9th, under the above heading, the response to our suggestion has not been sufficient to justify our putting the scheme into effect. However, those clubs who did respond may care to take up their own insurance schemes with the insurance brokers who were prepared to act on our behalf; they are: Messrs. Stafford Knight & Co. Ltd., 60, Fenchurch Street, London, E.C.3.

Mr. S. W. Simpson

● WE DEEPLY regret to announce the death, at the end of August, of Mr. S. W. Simpson, of Brentwood. He was well known to many model engineers in London and the Eastern Counties, not only as a first-class model maker himself, but as a charming and sympathetic personality. He was ever ready and willing to do all that he could to further the interests of our hobby; but he will, perhaps, be best remembered for "Simpson's Day" which, before the war, was a happy annual event when he, his wife and family were "at home" to a large party of model engineers. The last of these most enjoyable functions, with our friend as host, took place on June 4th this year, and was reported in our July 21st issue.

Although Mr. Simpson had not enjoyed very good health for some years, the news of his death will come as a shock to his many friends and acquaintances. We extend our sincerest sympathy to Mrs. Simpson and the family in their irreparable loss.

Proposed Club for Bedford

● MR. P. SMITH, Waterloo Lodge, 22, The Embankment, Bedford, thinks it is high time that a model engineering club was formed in that town. If any Bedford readers and their friends agree with this idea, they are invited to write to Mr. Smith at the above address.

Proposed Society for Dunfermline

● MR. W. MCNIE and other local modellers are interested in forming a society in their district, and would like to hear from others who would care to join. Mr. McNie's address is: 170, Rumblingwell, Dunfermline, Fife.

IN THE WORKSHOP

by "Duplex"

46—The Dial Thread Indicator

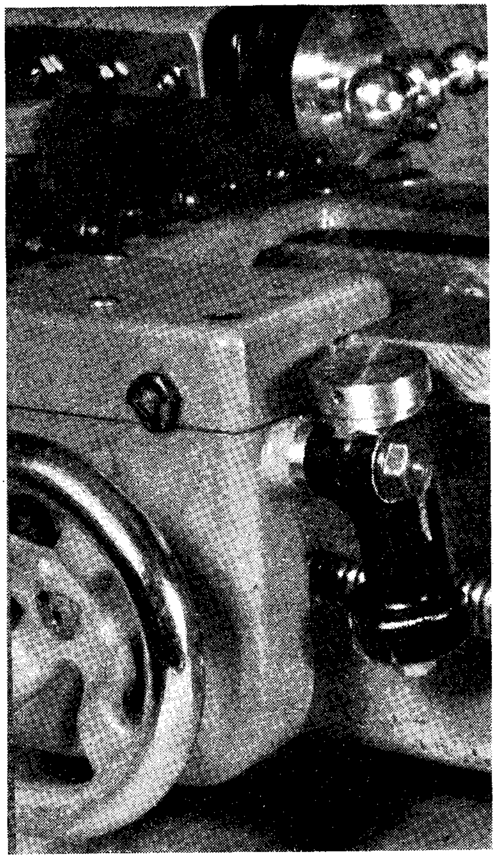


Fig. 1. Modified Myford thread indicator

THOSE whose experience goes back for some years will remember that the recognised method of ensuring correct engagement of the clasp-nut, when screwcutting, was to use the lathe tailstock as a back-stop for the saddle, and to mark the mandrel carrier plate and the leadscrew with chalk lines to indicate the relatively correct positions of the work and the leadscrew.

In this way, if care was taken, the clasp-nut could be closed at the right moment, when taking a succession of cuts over the work, without danger of cross-threading; that is to say, cutting a second thread on top of the first when the thread pitch is not a multiple of that of the leadscrew.

Nowadays, the fitting of a dial thread indicator to even the less expensive lathes has rendered these elaborate precautions unnecessary, and chalk marks and a saddle stop are apparently

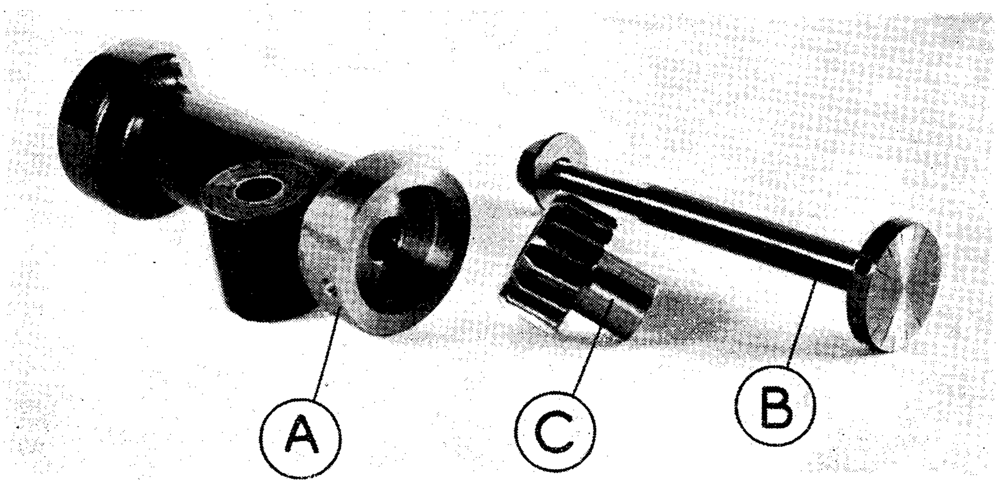


Fig. 2. The component parts of the thread indicator

now seldom used by newcomers to lathe work.

Before dealing with the construction of this device it may be as well to describe its manner of working and its method of use.

Clearly, if the screw thread to be cut is a multiple of the 8 t.p.i. leadscrew, that is to say 16, 24, 32 and so on, then the clasp-nut may be engaged with any thread of the leadscrew, with the knowledge that the tool will register with the work thread on all occasions when a series of cuts is taken.

Should, however, a thread of, say, 12 t.p.i. have to be cut, then the work will make $1\frac{1}{2}$ turns for each revolution of the leadscrew, or three turns of the work for every two turns of the leadscrew; therefore, were the clasp-nut engaged successively with each leadscrew thread, the resulting thread on the work would be alternately correctly cut and cross-threaded.

From what has been said, it will be evident that in the above instance some means is required for determining with certainty the exact point at which the clasp-nut can be engaged with the alternate threads of the leadscrew. This, and more, is exactly what the thread indicator is designed to do.

Where the leadscrew has 8 threads to the inch, the pinion engaging with it and driving the indicator dial usually has 16 teeth; this means that one complete turn of the dial corresponds to a distance of 2 in. on the leadscrew or to 2 in. of saddle traverse along the work. Moreover, as the dial has four main divisions, these graduations will indicate a distance of $\frac{1}{2}$ in. on the work or leadscrew.

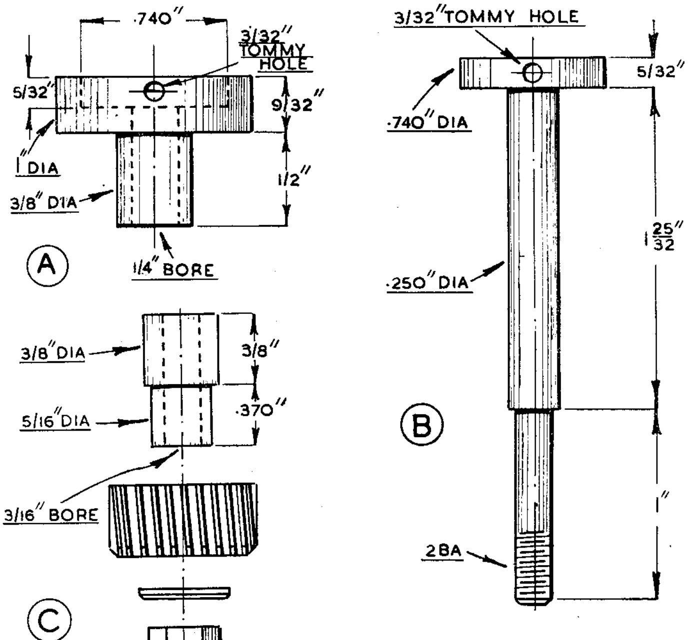


Fig. 3. *Working drawings of indicator parts*

The easiest way, perhaps, to understand the method of using the indicator is to find the shortest linear distance which will contain exactly a whole number of threads cut on the work.

Thus, for an odd-numbered thread such as 11 t.p.i., which has $5\frac{1}{2}$ threads in each half inch of its length, a full inch is required, corresponding with a half turn of the indicator dial and denoted by either pair of diametrically opposite graduations. Similarly, a half-thread, such as $11\frac{1}{2}$ t.p.i., will require two whole turns of the leadscrew to ensure correct re-engagement of the clasp-nut; this, of course, corresponds with two turns of the dial as indicated by any one division line.

In the same way, any even-numbered thread is wholly contained in a half-inch, and so any division on the circular scale will show when the clasp-nut can be closed. As has already been stated, the clasp-nut can be engaged at $\frac{1}{4}$ in. intervals on the leadscrew for threads, such as 12 t.p.i., which are divisible by 4, but to avoid confusion it is customary to divide the dial into four main divisions only, to and to make use of these for all even-numbered threads. Nevertheless, in the case of a square-thread leadscrew where engagement of the clasp-nut is rather more difficult than when a V-shaped or Acme thread is used, it may be found an advantage to subdivide the dial into sixteen divisions, denoted by short lines, to enable the clasp-nut to be more readily engaged during ordinary turning operations.

To recapitulate, when screw cutting, take the least linear distance that will contain a whole number of work threads and use the appropriate dial divisions corresponding to 2 in., 1 in., or $\frac{1}{2}$ in. as the case may be.

Although it is customary to number the divisions on the dial, this is hardly necessary and may even be confusing; for the great majority of threads cut are even-numbered and any of the longer lines will then serve; in the case of an odd-numbered thread, two opposite lines should be marked with the grease pencil, and for cutting a half-thread a single division is similarly marked.

The Myford Thread Indicator

As a result of having fitted new indexes to the feedscrews of a friend's lathe, we were asked to alter the thread indicator; the graduation lines were to be more finely cut to be in keeping with the new indexes, and their number increased to sixteen.

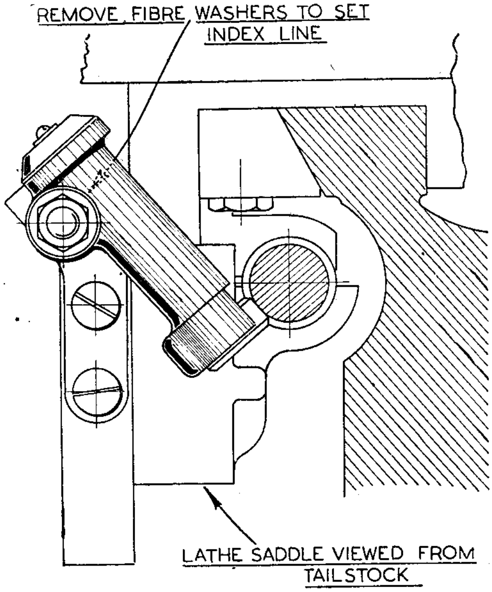


Fig. 4. The Myford-Drummond thread indicator

When the indicator had been dismantled it was decided to rebuild it, at the same time making the zero setting readily adjustable without the use of fibre spacing washers.

This adjustment was provided by fitting the driving pinion on a plain shaft where it was frictionally held by means of a clamp-nut. In passing, it may be noted that, as the spindle carrying the dial at its upper end is quite free to turn in its bearings and is subjected to very little wear, all that is required by way of lubrication is to apply some thin grease at the time of assembly ; in fact, oil is best avoided in this situation, as it tends to seep on to the surface of the dial and obscure the graduations.

The reconstructed indicator is seen in position in Fig. 1, and its component parts are illustrated in Fig. 2.

The body is first machined by mounting it on a stub mandrel and boring out the upper end to a diameter of $\frac{3}{8}$ in. and to a depth of 17/32 in. At the same time, the upper end is faced and the external surface of the head machined, as will be seen in Fig. 1. The work is then reversed on the mandrel and the lower end is also bored $\frac{3}{8}$ in., but to a depth of $\frac{7}{16}$ in.

To complete the work on the body, the lug bearing the index mark should be carefully filed flush with the surface of the boss provided for the attachment bolt, and the filed surface is afterwards painted to match the rest of the body.

The cap-piece, Fig. 3 (A), is machined from a length of 1 in. diameter round mild-steel to the dimensions given.

The material is gripped in the chuck and the spigot is turned to a firm press fit in the upper end of the body.

The bore is formed centrally by first drilling with a centre drill having a body $\frac{1}{4}$ in. in diameter; and the body portion is entered in the work for at least $\frac{1}{8}$ in. This is to give a true bearing for the $\frac{1}{4}$ in. D-bit which is used to finish the bore after an A-size drill has been fed in for a depth of $\frac{7}{8}$ in.

After the capping has been parted-off slightly in excess of the finished length, it is reversed in the four-jaw chuck and set with the bore running truly with the aid of the test indicator.

The cavity to receive the head of the dial shaft (B) is then turned with a small, pointed boring tool, and by reference to the leadscrew index the work is finally faced to bring the recess to the exact depth required. As shown in the photograph, Fig. 2, the bore is countersunk or counterbored for a short distance to provide clearance for the neck of the dial spindle.

An alternative method of boring and recessing the capping, and one which will more readily ensure concentricity, is to defer the boring operation until after the part has been turned on its external surface and parted-off. The work is now gripped by its spigot in the four-jaw chuck and set to run truly with reference to its flange ; the rest of the machining is then carried out as before.

The index line, which is also apparent in Fig. 2, is cut on the diameter by mounting a 45 deg. V-tool on its side at centre height in the lathe toolpost, and then feeding it outwards almost as far as the edge of the capping.

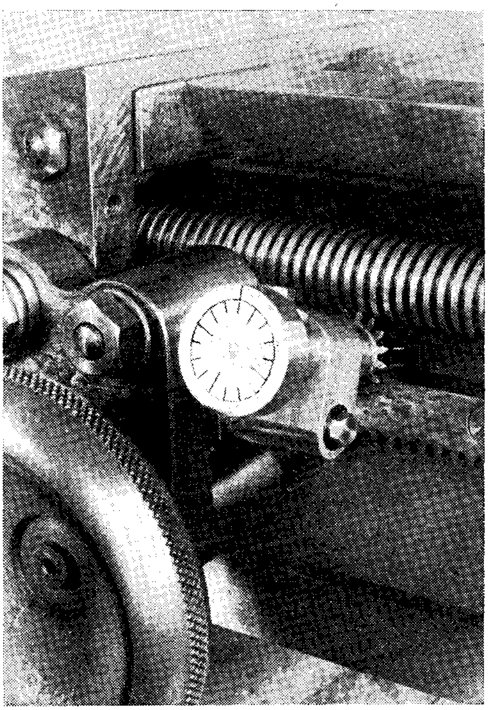


Fig. 5. Thread indicator fitted to Drummond lathe

It will be found that a line cut with this tool to a depth of 4 thousandths of an inch will have a good appearance.

The bushing fitted to the lower end of the dial spindle (B) carries the pinion and is also a running fit in the bore in the body; this part is shown in Fig. 3 (C), and in Fig. 2 it will be seen with the pinion mounted in place. By this construction, the pinion is secured to the dial spindle when the clamp-nut is tightened, and at the same time a bearing is provided in the body for the lower end of the shaft.

To make the bushing, a length of ½ in. diameter round mild-steel is gripped in the chuck, and after it has been faced and centre-drilled, a No. 13 drill is entered to a depth of 1 in. preparatory to reaming the bore to $\frac{3}{16}$ in. Both the pinion seating and the bearing portion are turned, but are left oversize for finishing at a later stage when mounted on the dial spindle. The work is then parted off a few thousandths longer than the dimension given so that it can be rechucked and the upper surface faced.

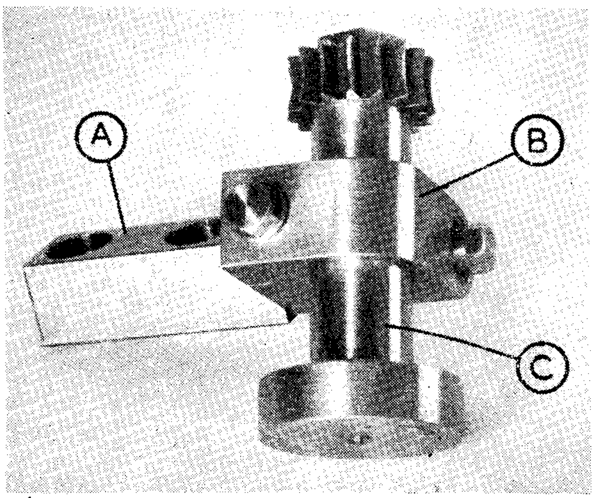


Fig. 6. Thread indicator made for Drummond lathe

The dial spindle (B) is made from ¾ in. diameter mild-steel gripped in the chuck and supported at its outer end by the tailstock centre.

The machining is quite straightforward, but the ¼ in. diameter portion should be made a close running fit in the part (A); in addition, the head should be carefully turned to fit the recess in the capping, so that, although it is free to revolve, the finished joint line should be hardly visible. At this stage, the bushing (C) is secured to the spindle by means of its clamp-nut, but a short spacing collar must be fitted between the nut and the bush to enable both the pinion seating and the bearing portion to be turned to their finished diameters. By adopting this method of machining, the outside diameter of the part is made truly concentric with the bore.

After the spindle has been parted-off, it is centred in the four-jaw chuck and the head is faced to a thickness one thousandth of an inch in excess of its given length to allow for finishing later. To ensure that the finished length of the head is exactly equal to the depth of the recess in the cap, the latter dimension can be checked in the following manner; put a $\frac{3}{16}$ in. diameter cycle ball in the recess and measure with the micrometer the length of the flange of the cap, first directly and then over the ball. The depth of the recess is then equal to the diameter of the ball, less the difference between the two micrometer measurements.

The next step is to cut the division lines, and it will be seen in the photograph that in this instance the dial has been indexed into sixteen divisions; this is to enable engagement of the clasp-nut to be readily made at all times, but, if preferred, four divisions only can be cut.

To index the sixteen divisions, a 40-T. wheel is secured to the tail of the mandrel, and mounted on the stud, a 25-T. wheel is keyed to a 50-T. wheel so that the former meshes with the mandrel wheel, and the latter is engaged by the detent fixed to the quadrant.

Sixteen divisions are then obtained by indexing from every fifth tooth of the 50-T. wheel. The backlash in the gears must here be taken up by means of a suspended weight attached by a cord to the lathe chuck, as previously described.

Each line is formed to a depth of 5 thousandths of an inch by taking three successive cuts, and the four long lines should be made of sufficient length to afford easy reading. The lines are, of course, cut towards the centre so that they end sharply.

As the head has been turned one thousandth in excess of its required thickness, it is now reduced by this amount to impart a good finish to the division lines and, at the same time, to make it lie exactly flush with the cap.

After the cap-piece has been pressed into the body with its index line correctly positioned, and the pinion has been pressed on to its bushing, the thread indicator should be assembled with the pinion clamp-nut turned finger tight. When one of the long division lines has been registered with the zero line on the capping, a toolmakers clamp is applied over pieces of thin card to retain the parts in this position. A hole to receive a small tommy bar, made of 12 gauge wire, is then drilled with a No. 37 drill 5/64 in. from the upper surface of the capping and to a depth of $\frac{5}{16}$ in. With the tommy bar in place, the pinion clamp-nut is fully tightened and the end-float of the spindle in the body is then tested. Should the end-clearance be found to be excessive, the pinion bushing is mounted on a stub mandrel and the requisite amount is turned off its upper face.

If, on the other hand, there is insufficient end-clearance to allow the shaft to revolve freely, then a facing cut is taken over the upper surface of the pinion itself when mounted in a similar manner.

Finally, with the tommy bar in place and the pinion clamp-nut slackened, the pinion is meshed with the leadscrew to afford a small amount of working clearance between the teeth; the bracket clamp-nut is then tightened to secure the indicator firmly in place.

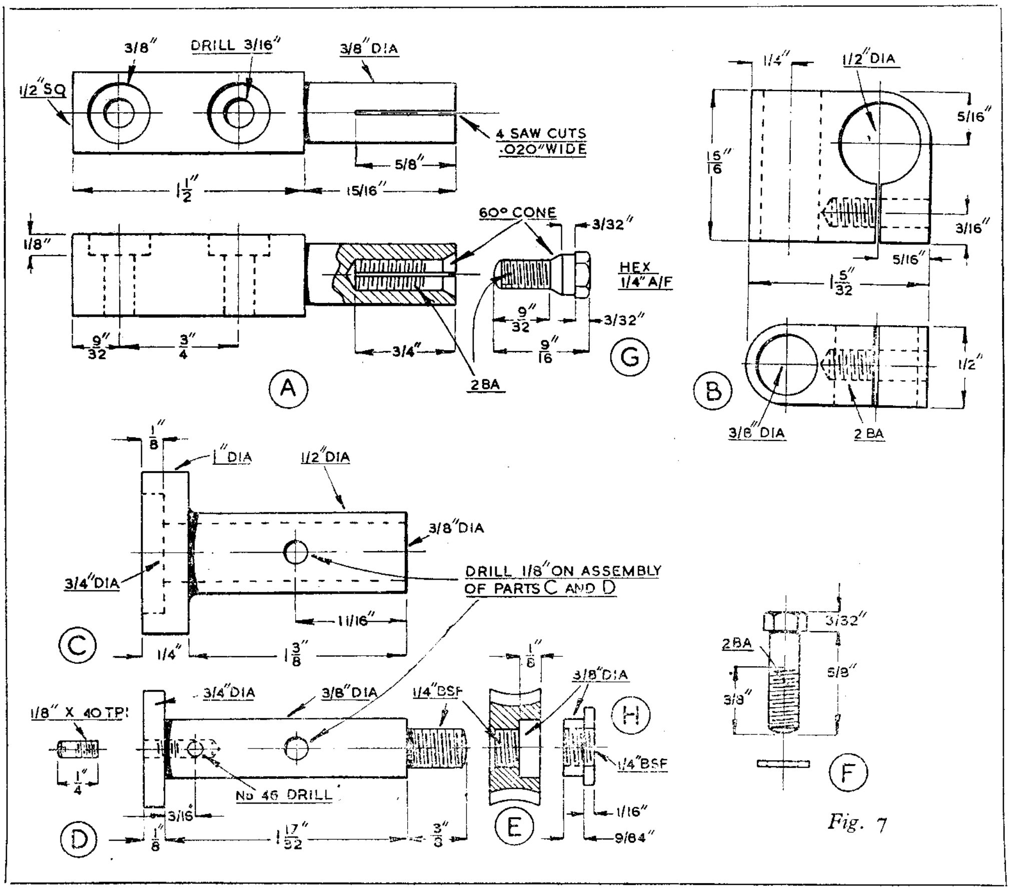


Fig. 7

to the rear face of the saddle apron by means of the arm (A) which carries the bracket (B) for holding the indicator body (C). The body in turn serves as a bearing for the rotating spindle (D), graduated on its upper surface and carrying the pinion (E) at its lower end.

The leadscrew is then turned in the forward direction to allow the clasp-nut to be closed, and, with the parts in this position, the pinion clamp-nut is tightened to complete the setting.

Fitting a Thread Indicator to the Myford-Drummond Lathe

The thread indicator made for the Myford ML7 lathe can also be fitted to the Myford-Drummond lathe by means of a bracket of the form shown in Fig. 4 designed by the makers.

On taking delivery of a 3½ in. Drummond lathe some years ago, one of the first additions made was to design and fit a thread indicator of the type illustrated in Fig. 5. In the photograph the tubular leadscrew guard fitted to the right of the saddle has been removed to give a clearer view.

Reference to Fig. 6 and to the working drawings in Fig. 7 will show that the indicator is attached

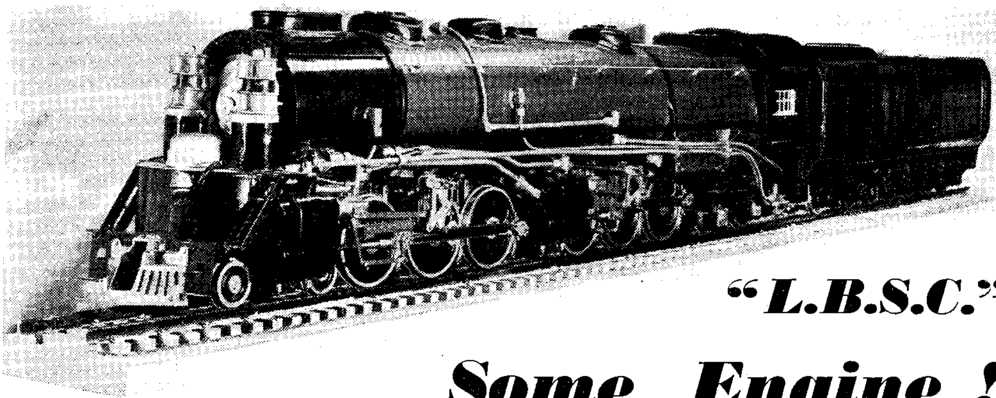
The arm (A) is formed from a length of ½ in. square mild-steel and is secured to the apron by two 2-B.A. screws.

The projecting cylindrical portion on which the bracket fits is drilled to a depth of ¾ in. and tapped 2-B.A. To allow this part to be expanded by the coned screw (G), thus securing the bracket in place, the nose is countersunk with a centre drill, and four longitudinal cuts are made with a slitting saw.

The bracket (B) is drilled and reamed to render it a firm sliding fit on the arm, and, in addition, a ½ in. diameter hole is formed to accommodate the indicator body (C), which is secured in place by the clamp-screw (F) closing the saw-cut shown in the drawing.

The body (C) is first turned to an accurate sliding fit in the bore in the bracket; it is then reversed and set to run truly in the four-jaw

(*Continued on page* 376)



"L.B.S.C."

Some Engine !

GOOD folk in the United Kingdom who have built " Hielan' Lassies " and have become rather perturbed at their ultimate weight and size, should take a deep breath (if they haven't anything stronger handy !) before they have a look at the reproduced photograph above of Mr. D. W. Massie's latest achievement. She is a $3\frac{1}{2}$ in. gauge copy of the Union Pacific's mixed traffic engines, suitable for passenger or fast freight, and is of the simple articulated type, all four cylinders taking steam direct from the boiler. The engine closely follows her big sisters in outline and details, with the sole exception of the cab, which is of Canadian Pacific pattern, as Mr. Massie prefers the appearance of it. As the engine is 8 ft. long, and weighs roughly about 800 lb. it would seem that there is a " v " missing from our worthy friend's name, for he is certainly a close relative of Bill of that ilk !

Here are some details of the job. The bar frames are cut from $\frac{3}{8}$ in. steel, the axleboxes having double-row self-aligning ball-bearings. The working leaf-springs are fully equalised. The twelve coupled wheels are $4\frac{1}{4}$ in. diameter. The four cylinders are $1\frac{3}{8}$ in. bore, 2 in. stroke, with flat slide-valves in castings made to represent piston-valves. Lubrication is attended to by a six-feed Nathan lubricator, fitted ahead of the smokebox. Mr. Massie says the Nathan Company made the lubricator and just insisted that it was fitted to the engine ; it is a beautiful job, but needed considerable adaptation to get fitted and connected. It now works fine. Ball-and-socket joints are fitted to the steam and exhaust pipes, same as on the full-sized engine ; also three swivel joints on one side, and another ball-joint with a sliding sleeve on the other. Incidentally, great minds still thinking alike, as the classics say, I have schemed out a similar joint suitable for the hand-pump connection on British type locomotives of similar gauge ; and all being well, will describe and illustrate it shortly. It is more flexible than a coiled pipe, and a better job than the usual " feed-bag " hose. The valve gear is Walschaerts, provision being made in the reversing gear, for the articulation. It will be noticed that the drive is taken by the third pair of wheels on each unit, same as my own " Annabel."

Our friend hasn't sent any dimensions of the boiler, though I understand it is built to the principles advocated in these notes. The fittings and mountings include a slide-valve type throttle, two superheaters, double chimney, two sandboxes, two safety valves, chime whistle, two steam-gauges, and two water-gauges. The boiler feed is supplied by two injectors, and there is also a twin-cylinder steam pump under the footplate, which operates a water pump by a Scotch yoke. The cab has all the usual footplate fittings, and also has sliding windows, working doors, and the C.P.R. type of vestibule. The firehole baffle, and the grates, are cast in stainless steel. The brake gear is steam operated.

The tender has fourteen wheels ; leading bogie and five rigid axles as in full size. Sounds strange to speak of a 4-10-0 tender ! The sides are made from 16-gauge brass sheet, and every rivet in the whole bag of tricks had to be individually turned, as our friend did not like the shape of the original heads—there's a lesson in patience for some of our fraternity ! The baffle-plates inside, are all riveted in, and soft-soldered. The tank has a well-bottom, made from bronze, which in itself holds an American gallon. Ball-bearings are fitted to all the axles, also working leaf-springs, equalised throughout. Lester Friend, of the Yankee Machine Shop, Danvers, Mass., supplied many of the castings used in building the engine.

At the time the photo was taken (by Associated Screen News), there were still a few details to add, such as supplementary handrails, ladders, and so on. Anyway, the locomotive is a fine job, and our worthy friend deserves hearty congratulations on his handiwork. I don't think I would have tackled the job of turning the heads of all those rivets—life's too short !

Progress on the " cut-from-solid " Atlantic

There is certainly plenty of patience on the other side of the big pond, if you know where to look for it. Here is another illustration showing that Al Milburn is getting well along the road with the Atlantic type engine he is virtually carving

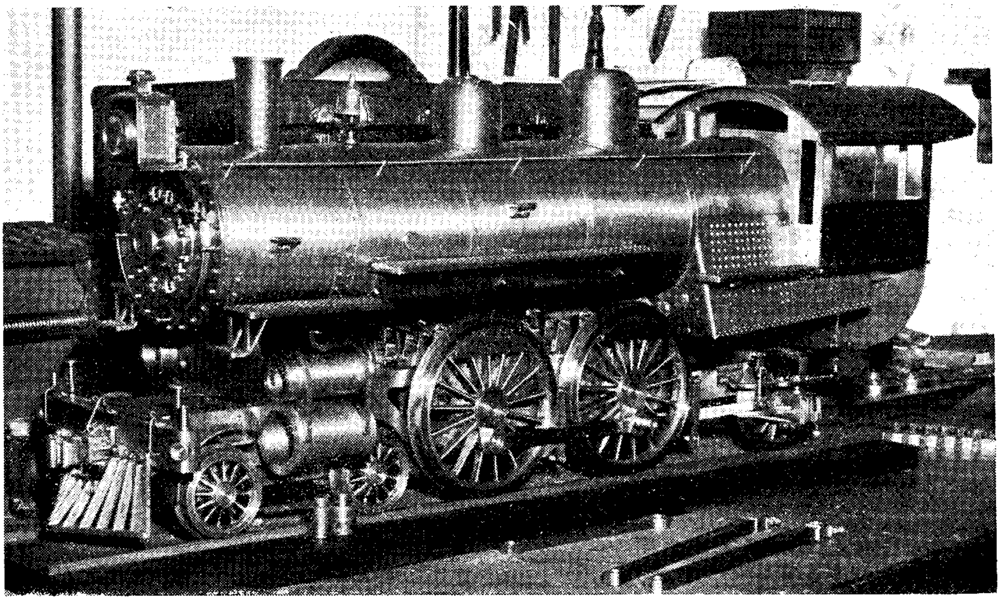


Photo by] [*Roy Curtis*

A fine example of patience and perseverance

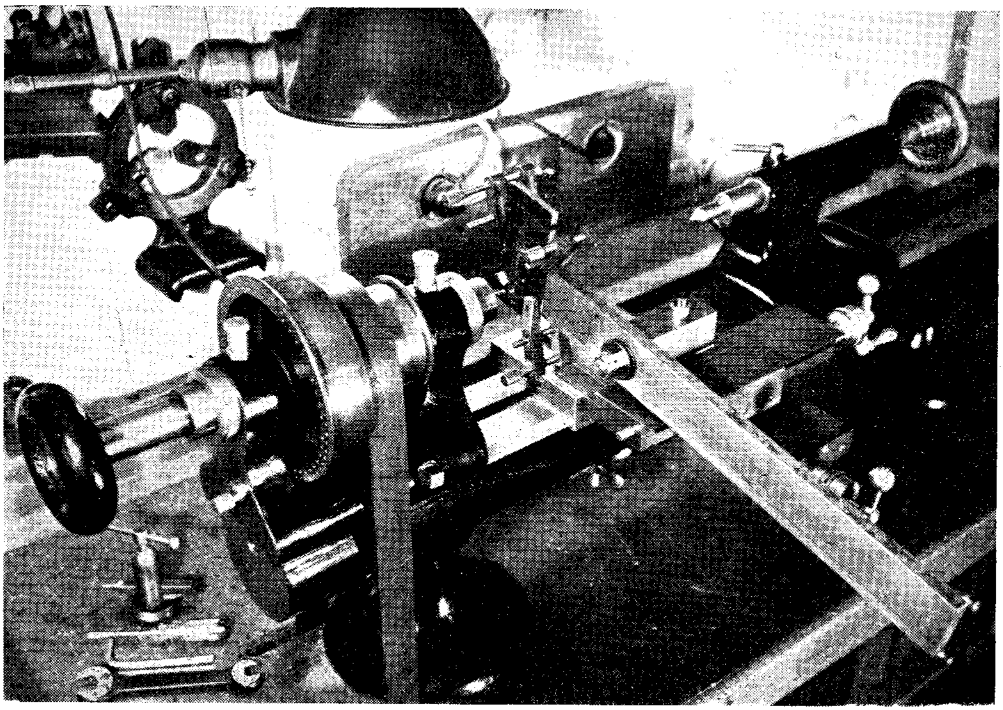


Photo by] [*Alvin Milburn*

How the Atlantic's links were milled

out of the solid. In a recent letter, he said that my reference to him as a friendly rival to Dr. J. Bradbury Winter, fairly put him on his mettle, and he is endeavouring to emulate the worthy Doctor's wonderful craftsmanship to the best of his ability. I'm open to bet that our old friend up at Coniston will be proud to learn of the stimulation given by his magnificent work, to yet another ardent follower of our craft. There is somebody else who is going to raise a smile when he takes a look at the picture of the Atlantic; and unless I miss my guess, it is our old pencil-magician friend Mr. F. C. Hambleton. What about that dinky headlamp, brother? Yes, I know it should, by the good rights, be an electric one, but that doesn't alter the fact that it is a nice bit of work. Also, those good folk who love to see lots and lots of rivet heads, can thoroughly enjoy themselves with this picture and a magnifying glass.

Mr. Milburn also sent a close-up shot, showing the way he milled the expansion links on his lathe, according to the method I described in these notes. Incidentally, Mr. Milburn built a 2½ in. gauge 4-8-4, a double-sized edition of the "O"-gauge "Lucy Anna" which I described in a now defunct American journal, on this small lathe, which was his only machine-tool at the time. The filing-rest, shown hanging up on the wall in the top left-hand corner of the picture, was made from instructions given by another writer in this journal. The lathe itself is very similar, both in size and type, to my own Boley.

Steam Brake Valve for "Doris"

On the full-sized L.M.S. "Class 5" engines, the brake valve is a small affair located in the position shown in the view of the backhead fittings and cab front plate, published some time ago. This makes it rather difficult to provide a brake valve of the usual disc pattern, small enough to fit into the available space, and yet be robust enough to stand up to the job, at the same time providing adequate steam ports and passages. If builders of the engine don't object to fitting a valve that is a little oversize, they can make one of the type described for the "Maid" and "Minx," but just a little smaller. The body can be ¾ in. diameter instead of 1 in., and the valve ½ in. diameter. The ports can be drilled with No. 50 drill; and the pipes leading to brake cylinder and exhaust, may be silver-soldered direct into the valve body, so that the valve may be made to look neater. The upper union can be made 7/32 in. by 40, and the nut made from ¼-in. hexagon brass rod. The complete valve can be placed in the location shown in the illustration referred to above, and supported by a little bracket attached to the valve body between the lower pipes, and to the backhead, similar to that shown in the accompanying illustration.

Valve Body

Builders who prefer a smaller valve, can make one as shown here. This is a simple three-way cock. I don't care much for plug-cocks as a general rule, they are too fond of leaking and sticking at the slightest provocation; I have one or two painful memories of trying to shut them off on the quick, when a gauge-glass burst on one of the old Brighton engines. However, I don't think you'll get any trouble with the gadget shown, if you do the same as I do with the plug-cock which drains our little portable gas-fired boiler that my fair lady uses on wash-day, viz., take the plug out now and again, and give it a dose of cylinder oil and graphite. The plug never leaks, and she has no difficulty in turning it on and off.

To make the valve body, chuck a piece of ½-in. round bronze or gunmetal rod in three-jaw. Face, centre and drill about ½ in. depth with ¼-in. drill. Part off at ⅜ in. from the end. Next, set out and drill three No. 32 holes in the thickness of the body. I have shown one at the top, and each of the others at an equal distance from the bottom, the combined angle being 90 deg. (right angle), but there is no need to bother about "mike" measurements.

Valve Plug

For the plug, chuck a bit of ⅜-in. round rod in the three-jaw, and turn down about ⅞ in. of it to 11/32 in. diameter. Further reduce ¼ in. of the end to 5/32 in. diameter; then turn down 5/32 in. of that, to 3/32 in. diameter and screw it 3/32 in. or 7-B.A. File the remains of the 5/32 in. part to form a square, using a flat file with a "safe" edge. I've described how to file squares so many times, that I should imagine most builders could do the job with their eyes shut. Now the great trouble with most folk who try to make plug-cocks, is that they get the tapers on the plug, and in the body, to different angles; I've already explained the easy way to get over that, when describing how to make cylinder cocks. This one is done same way. Set your top slide over to, say, 5 deg. (if it hasn't a graduated scale, just guess the angle; it won't make the least difference) and turn a taper on the chucked piece, so that the end next the square, is just under ¼ in. diameter. *Don't shift the top slide*; take the embryo plug out of the chuck, put a piece of ⅜-in. round silver-steel in, and turn a similar taper on the end, until the small end is about 7/32 in. diameter. Then put the other piece of rod back, set your top slide parallel again, and part off the plug at 9/16 in. from the shoulder.

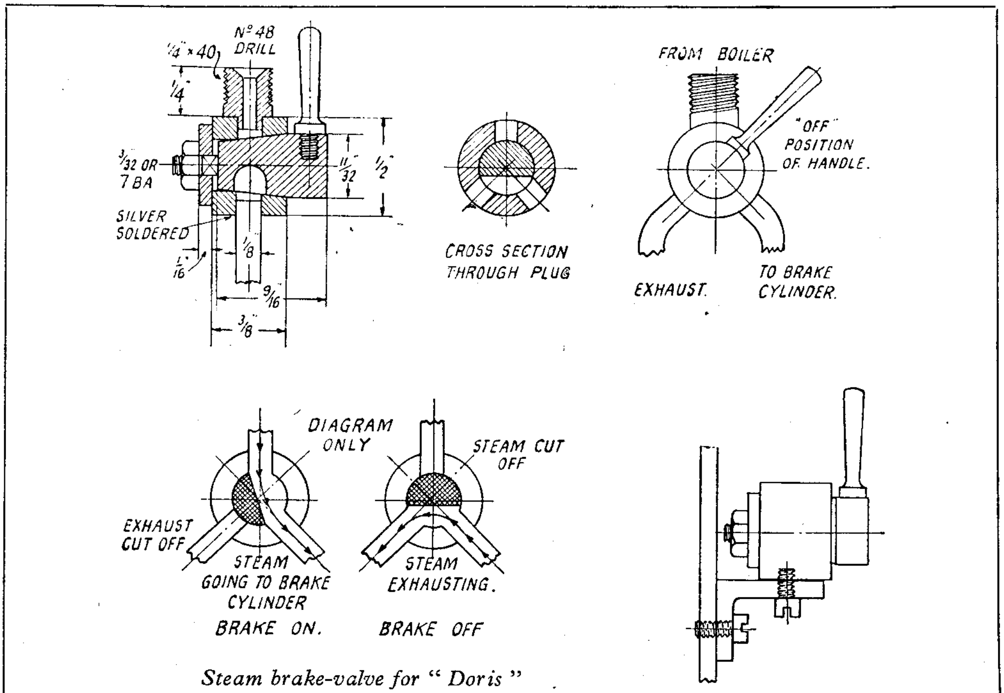
Be Careful When Reaming!

File away half the diameter of the tapered part of the piece of silver-steel, or file four flats on it, just as you prefer; then harden and temper to dark yellow, same as I describe for D-bits, injector reamers and so on. Rub the flat face on an oilstone, and put the gadget in the tailstock chuck. Put the valve body in the three-jaw, with the faced side inwards; make sure it runs truly. Then bring up the tailstock, and enter the reamer in the hole in the valve body, pulling the belt by hand. If you run the lathe, it is a million dollars to a pinch of snuff, that the reamer will chatter; that is the cussedness of things in general! Anyway, ream the hole carefully, but—very important this—don't let the reamer go too far in. There should be enough parallel left, at the faced end of the hole, to ensure that the plug stops short of the end, to allow for its

being ground in. Take a look at the sectional illustration, and you'll see what I mean. The taper reamer will remove any burring left when drilling the pipe and union holes.

Next, with a $\frac{1}{8}$-in. rat-tail file, file a half-round groove across the tapered part of the plug; see sections. This should be just long enough to bridge any two of the holes in the valve body.

plug lightly with a mixture of cylinder oil and graphite. If you haven't any graphite powder, scrape some off a blacklead pencil. The washer is made by chucking a bit of $\frac{3}{8}$-in. brass rod; face, centre, drill about $\frac{1}{8}$ in. depth with 3/32-in. or No. 40 drill, and part off a $\frac{1}{16}$-in. slice. File out the hole with a watch-maker's square file, until it fits easily on the square at the end of the



Steam brake-valve for "Doris"

See that there are no burrs left. Now fit the handle; this can be turned up from a bit of 5/32-in. rustless steel or nickel-bronze rod, and needs no detailing. Screw the end 3/32 in. or 7-B.A. When the groove in the plug is horizontal, and at the bottom, as shown in the section, the handle should incline about 45 deg. to the right, as shown in the front view, so drill a No. 48 hole at that location, tap it to suit the handle, and screw the latter into place.

Plug-grinding Tip

Before grinding in the plug, hold the valve body temporarily in position against the backhead, and see what length of pipe is needed to connect it to the brake cylinder. Cut a piece to length, also a similar piece for the exhaust, which may be a little shorter; also make a $\frac{1}{4}$ in. by 40 union nipple or screw, same as described for boiler fittings. Silver-solder the pipes and union screw into the holes in the valve body, then carefully grind in the plug. I never use emery for grinding non-ferrous metal; pumice-powder and water is all right, or scrape a few grains off your oilstone, and use that. Be careful to wash off any grit that may cling to plug and socket after grinding; then smear the

plug. An ordinary commercial brass nut completes the job. Be careful, when assembling, that the truly-faced side of the washer goes next to the valve body. Adjust nut until the valve operates easily, without being slack.

Erection and Operation

The complete valve being so small and light, the pipes are easily capable of providing all the support needed, so that the valve really only needs steadying against the small amount of pressure needed for turning the handle. This can be provided by the little bracket shown in the illustration; it is merely a bit of 16-gauge brass about $\frac{3}{16}$ in. wide, bent to the shape of a bracket with unequal arms, one being about $\frac{9}{16}$ in. long, and the other about $\frac{7}{16}$ in. This is attached to the valve, and the backhead, by 3/32-in. or 7-B.A. screws as shown, running through No. 41 holes drilled in bracket, into tapped holes in valve body and backhead. Warning—be mighty careful not to pierce the plug; a safe alternative would be to silver-solder the bracket to the valve body at the same time the pipes were attached, and then there would be no risk whatever.

The connections are simplicity itself; the pipe

leading from the boiler turret on the left side, is cut to length, and furnished with a union-nut and cone for connecting to the steam inlet of the valve. The right-hand pipe on the valve also has a union-nut and cone, for connecting to the union on the brake cylinder. The exhaust pipe is left open, the end being set so that the exhaust steam is directed anywhere between the rails.

The action is as follows. When the driver's handle is moved to the left, the groove in the cock-plug moves to the position shown in the "brake on" diagram; steam then passes from the upper hole, through the groove, to the lower right-hand hole, thence to the brake cylinder, pushing down the piston and applying brakes. Moving the handle to the right, causes the steam to be cut off, and the groove to connect the two lower holes; the steam then escapes via the groove and the left-hand hole, through the exhaust pipe, to the atmosphere. The release spring pulls the brakes off. Before operating the brakes for the first time on a run, open the drain cock, put the handle to the "brake on" position, and blow some steam through the cylinder to warm it. The drain valve should be left open when the engine is standing; incidentally the drain cocks on the engine cylinders should be treated likewise. I always leave them open on my own engines, when same are "dead," just as in full-size practice. Instances have occurred in more than one running-shed, where an engine with a leaky regulator valve has been lit up with the cocks closed. The reverse gear is *supposed* to be always in the middle, when the engine is in the shed; but what often happened, was, that in the far-off days before engine-cleaners became an extinct tribe, one of them would shift the lever, so that he would better be able to get at the rods and links, especially with inside cylinders and valve-gear. Human nature being what it is, he might probably forget to put it back again. Consequently, when the engine got up steam, leakage past the defective regulator valve would accumulate in the cylinders, and presently the engine would move herself; only a little, true enough, but it doesn't need much movement to crush some unlucky wight between the buffers, or maim a hand or foot under a wheel or amongst the "works." With the cylinder drain cocks left open, it couldn't happen. Some of the Stroudley engines had a little snifting valve under the steamchest, which remained open when the engine was standing, and automatically drained away any condensate water. This also took care of any steam leakage past the regulator, which was almost unheard of with the Stroudley type. On the "Gladstones," this valve was at the bottom of the underneath steamchest, alongside the solitary drain cock. Those engines which had steam sanding-gear, took steam for same direct from the steamchest via very short pipes, so we didn't have to wait a month of Sundays before the sands operated. On the Billinton engines, steam had to travel all the way from the valve on the backhead, to the sand ejectors below the driving wheels, via a $\frac{3}{8}$-in. copper pipe; and by the time it got there, and the condensate water had been blown out, we had usually got a start, and didn't want any sand at all!

Speaking about sanding gear, if anybody wants to fit a working sander to "Doris," it can be done on the lines described for the "Maid of Kent," only making the parts smaller in proportion; personally, I don't think it is worth the trouble with a small six-coupled engine. I have fitted one to "Grosvenor," but that is only a bit of swank, to show how much weight a single-wheeler can start, if she is put to it.

Well, all we now need to finish off little "Doris," is the tender brake gear; and all being well, I'll deal with that in a final instalment of this "serial."

In the Workshop

(*Continued from page* 371)

chuck for boring and reaming the bearing for the spindle (D), and at the same setting the recess for the head of the spindle is also turned to ensure concentricity. Finally, the index line is cut with a V-tool mounted on its side at centre height in the lathe toolpost.

The machining of the spindle (D) is a straightforward turning and threading operation, and, following this, the part is reversed in the four-jaw chuck for facing the head to the correct thickness and cutting the sixteen scale lines in the manner previously described. Although a lubricator screw is shown, this as already explained is, perhaps, best omitted.

The sixteen-tooth skew pinion, which is screwed into place and then secured by a shouldered lock-nut, was obtained as a standard fitting from the lathe manufacturers.

The spindle should now be inserted in the body and clamped in position by placing a washer under the pinion and screwing it down firmly; a $\frac{1}{8}$ in. diameter cross-centre tommy hole is then drilled right through both the body and spindle, in order to facilitate locking the pinion securely on the shaft or dismantling the parts when required.

The indicator can now be assembled and attached to the lathe apron. The pinion is brought correctly into mesh by rotating the indicator bracket on the arm, and at the same time, the body is moved backwards or forwards to set the pinion on the centre-line of the leadscrew. With the clasp-nut closed and the leadscrew rotated in a forward direction, a division line on the dial is set to register with the index line on the body; this is effected either by rotating the body itself or by sliding the bracket along the arm, but in any case, for the sake of appearance, the index line on the body should be set to lie vertically.

Machine Tools and Appliances

in the Competition Section of the "M.E." Exhibition

EVEN where a machine as a whole is of original design, there is no need for the construction of the component parts to be at fault, for these machine elements can either be copied from any standard machine, or their proper dimensions can usually be obtained from a book of reference. In this respect, the novice, if he will but take thought, is on an equal footing with the expert who relies largely on his past experience and inherent engineering horse-sense to arrive at a satisfactory design. Again, the selection of suitable materials for shafts, bearings and bushes should present no difficulty.

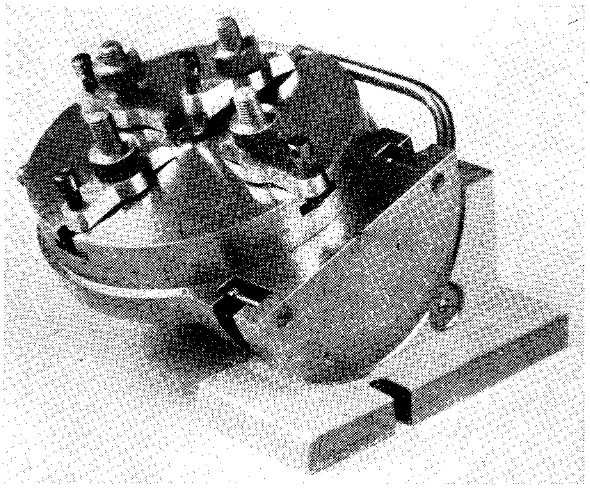


Fig. I. *Universal rotating and dividing table*

Where quick results are desired, possibly at the expense of mechanical efficiency, there is a tendency to use commercial bolts and screws as bearing shafts ; but, as the unthreaded portion of these components may be inaccurate both in respect of size and parallelism, they should not be used for this purpose where any important duty is required of them.

Where high-class work is concerned, it is usually advisable, when fitting a load-bearing shaft, to lap both the shaft itself and its bearings to obtain a close running fit. A lapped shaft is easily recognised with the aid of a hand lens, which will reveal the fine scratch marks even on a highly finished surface ; and even after considerable use, the oil in the bearings will remain clean, instead of being blackened by the presence of metal particles torn from the rough bearing surfaces. Moreover, it will be found that bearings finished in this way will run quietly and will have a long working life.

When commercial hexagon bolts are used, their heads should be faced and chamfered in the lathe, and the flats should be finished with a fine file applied in the direction of the long axis of the bolt. Screw-heads should similarly be well finished, and, to improve the appearance of high-class work, the slot should be cut narrower than in the commercial variety by using a fine slitting saw. A turned finish, obtained by taking a fine cut with a sharp tool liberally supplied with cutting oil, usually has a better appearance than one formed with emery cloth, as the latter may exhibit a glossy finish and its presence is given away by the edges being slightly rounded.

Flat surfaces look well when finished by taking crossing cuts with a hand scraper, but these should not be used to distract attention from poor work.

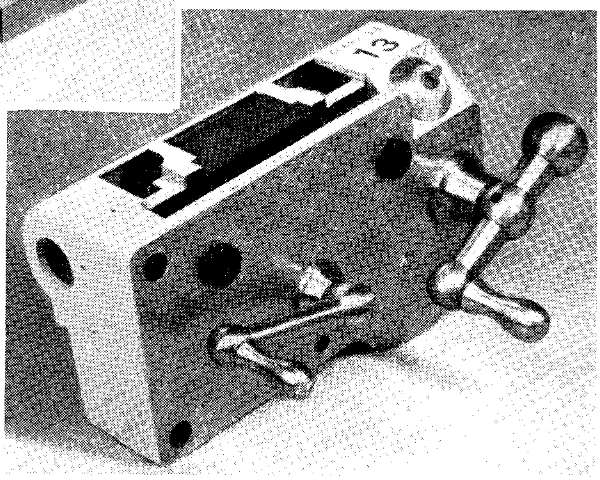
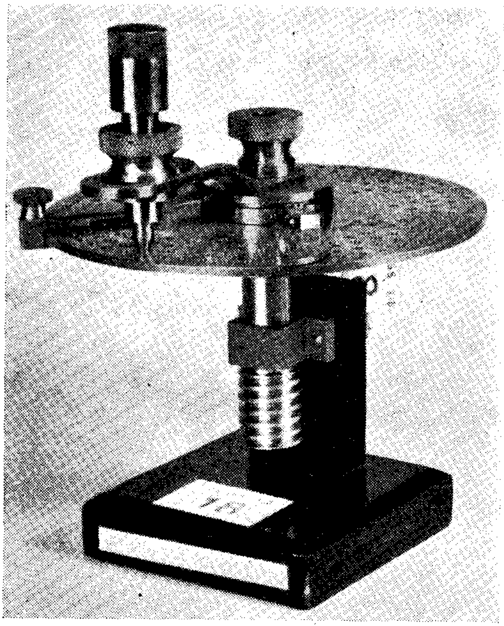


Fig. 2. *Lathe apron with built-in thread indicator*

Graduation and index lines only have a good appearance when machine cut with a narrow-pointed V-tool ; the aim, here, should be to cut narrow, square-ended lines of sufficient depth to appear dark in colour. In addition, the length of the lines must be carefully calculated to ensure that the scale can be easily read.

It is important to maintain uniformity of

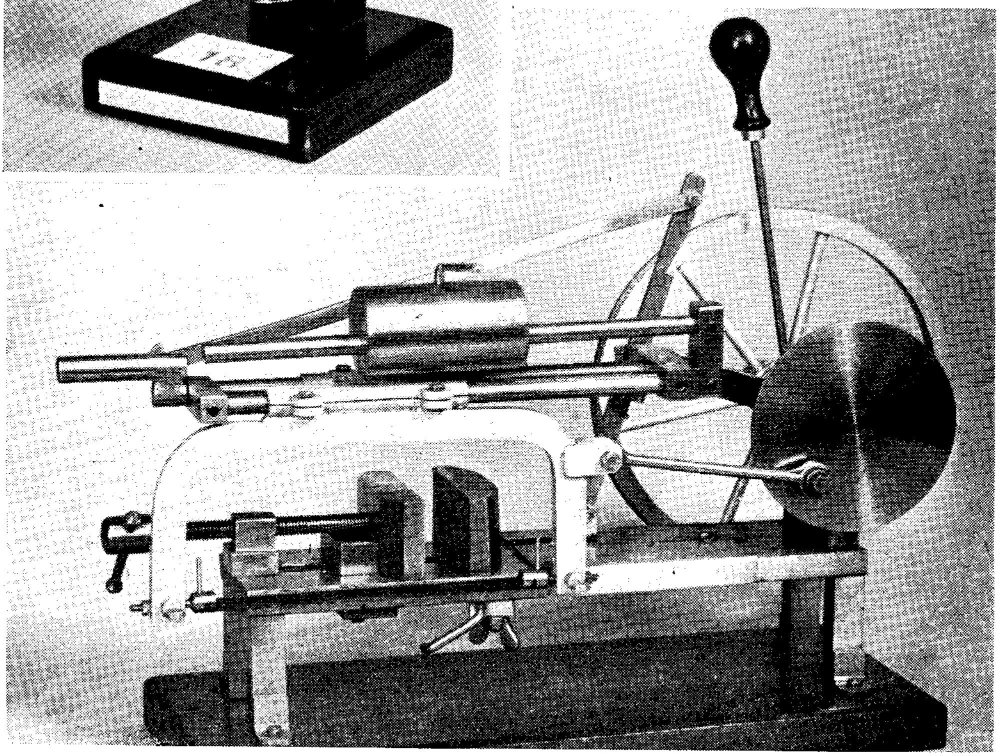


A brief description of some of the tools entered in the Competition Section may serve to illustrate some of the points alluded to above, and the adoption of a critical attitude and a touch of asperity, perhaps, is in no way intended to detract from the merits of the work or, least of all, to discourage future attempts and aspirations for Cup and Medal honours.

The Silver Medal in this section was won by Mr. A. E. Bowyer-Lowe with a universal rotating and dividing table for use on the table of the drilling or milling machine. The workmanship in general reaches a very high standard and, as will be seen in the photograph, Fig. 1, the graduation lines and figures are well proportioned and finely cut. The table dogs

Left—Fig. 3. A lathe mandrel dividing-head

Below—Fig. 4. Small power-driven hacksaw, taking 6 in. blades



finish throughout the work; that is to say, the degree of finish given to turned and flat surfaces alike should be consistent, so that the work as a whole creates a good impression. It is often difficult to decide whether the screw-heads appearing in the work should be blued or left plain; this will depend largely on the character of the work, for instrument parts are usually improved by this treatment, whereas polished and blued screw-heads look out of place in roughly finished surroundings.

are highly finished and hardened to resist wear. The various surfaces appear to be finished by accurate machining rather than by the application of emery cloth, a practice which, as already mentioned, might well be more generally adopted.

Mr. W. H. J. Goatcher won the Bronze Medal with a cleverly designed apron gear for the 3½ in. Drummond lathe. This device conforms with standard practice by incorporating a divided clasp-nut operated by downward pressure of the control lever. A very neat form of thread

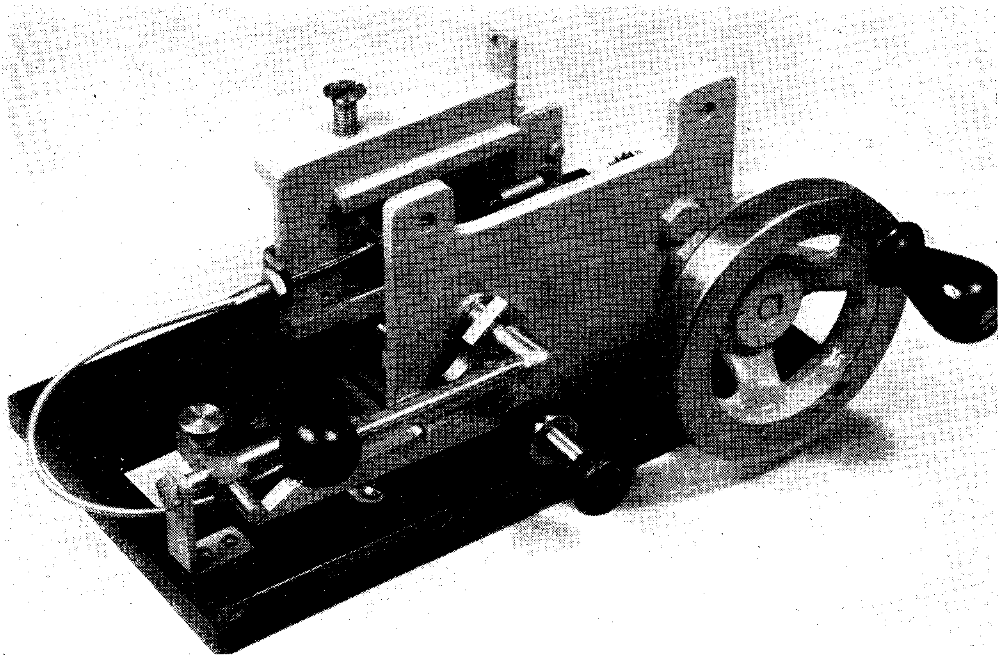


Fig. 5. Apron gear for the Relmac lathe

indicator, as will be seen in Fig. 2, is built into the apron, and the appearance of many lathes would be enhanced if this form of construction were more widely adopted. The workmanship is excellent and the cover joints are well fitted.

The mandrel dividing head illustrated in Fig. 3 and entered by Mr. A. S. Hume has been made in accordance with a design published some years ago by Mr. Ian Bradley in THE MODEL ENGINEER. The workmanship is good and the worm seems to be well cut; but unfortunately the general appearance is somewhat marred by the index figures being too deeply punched, and moreover, the knurling in some places is rather poorly formed.

The small belt-driven hacksaw machine constructed by Mr. T. Spike is depicted in Fig. 4. At first sight, the crank plate appears to be made of too thin material, and the connecting-rod would, perhaps, be improved if it were bushed

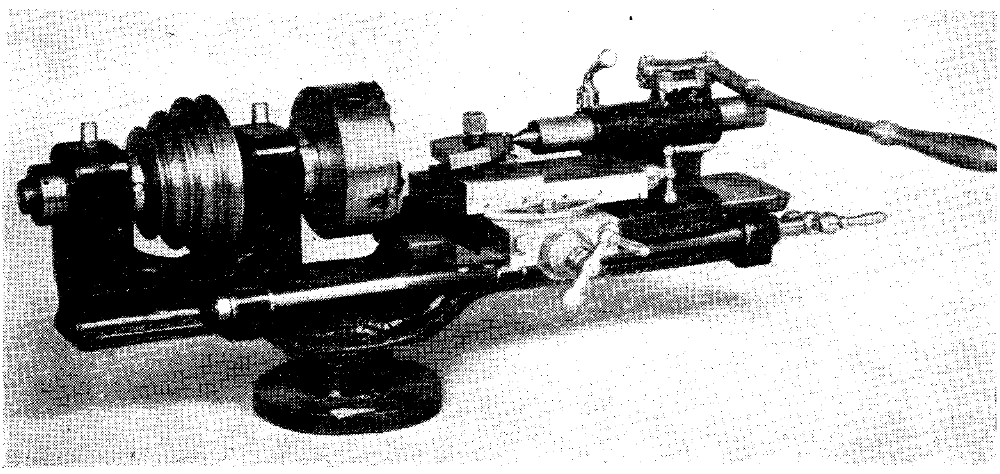


Fig. 6. Small lathe of $1\frac{1}{4}$ in. centre height

and were more robustly constructed. In machines of this type, rigidity of the saw carriage and its mounting is of great importance, a point which does not seem to be fully realised in this design.

The Relmac lathe apron shown by Mr. S. H. Abigail and illustrated in Fig. 5, has many ingenious features and is nicely made, but control of the leadscrew-nut by a Bowden cable would not appeal to all designers, and breakage of the coil spring fitted would result in failure to disengage the nut. A cleverly designed trip gear has been incorporated for opening the clasp-nut at any desired point.

The lathe of $1\frac{1}{4}$ in. centre height, exhibited by Mr. C. Grover, is shown in Fig. 6. This tool appears to have a well-made headstock, but the working of the machine slides is neither as free nor as smooth as might be expected. The lines and figures inscribed on the feedscrew indexes are roughly cut and seem to be out of proportion. If the nuts and bolt-heads were finished in the manner previously suggested, the appearance of the machine would be improved.

Mr. F. Lewis has exercised considerable ingenuity in building a small drilling machine from scrap material mostly obtained from an old Delage car. Although the design has obviously been modified to suit the materials available, the detailed fittings are well constructed and include a depth stop as well as a feed scale.

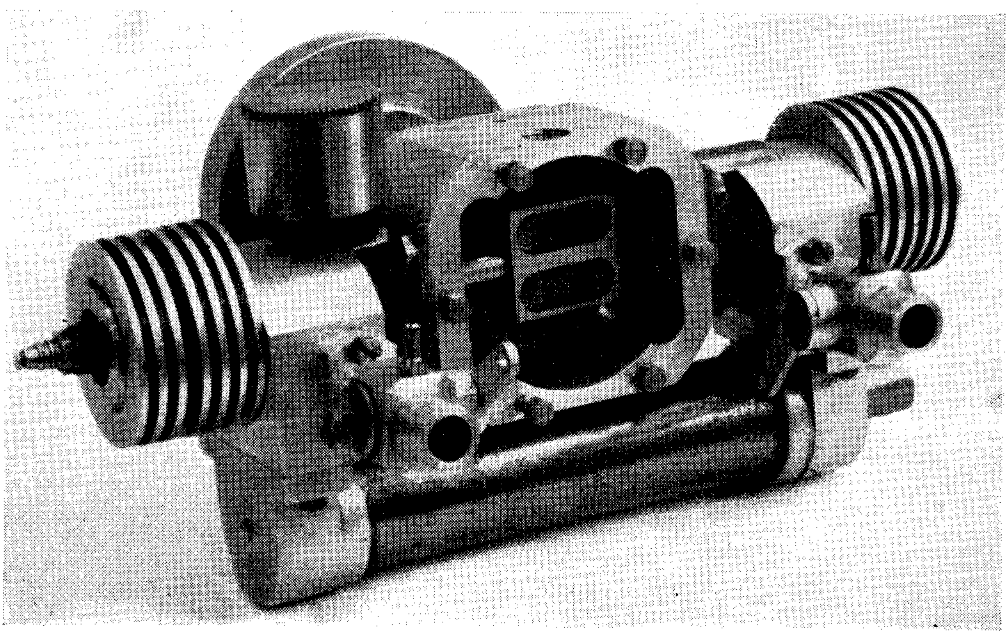
The drilling machine, based on the "M.E." design and constructed by Mr. S. Jones, has been built mainly without the use of castings. The modified feed lever and other details described in THE MODEL ENGINEER have been incorporated in the design, but the fitting of a tilting table is regarded by some as a very doubtful advantage, and many workers prefer an accurately aligned fixed table to which packing blocks are added for angular drilling operations.

*I.C. Engines at the "M.E." Exhibition

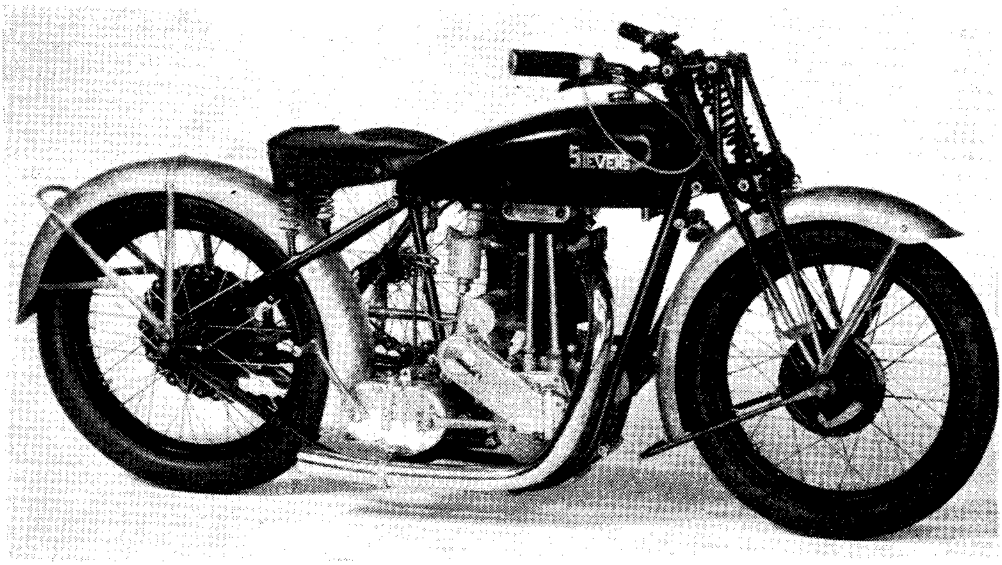
SEVERAL very interesting examples of working model i.c. engines appeared among the Club exhibits, the Model Power Boat Association being, as usual, prominent in this respect.

**Continued from page* 350, "*M.E.*," *September* 15, 1949.

G. Lines, of the Orpington Club, who is a well-known experimenter both in flash steam plant and i.c. engines, exhibited his complete hydroplane "Sparky" fitted with a 15 c.c. 2-stroke engine of original design, which made its first appearance this season, but has already won several important races. A still more interesting



An experimental 10 *c.c. horizontal twin two-stroke, by G. Lines*



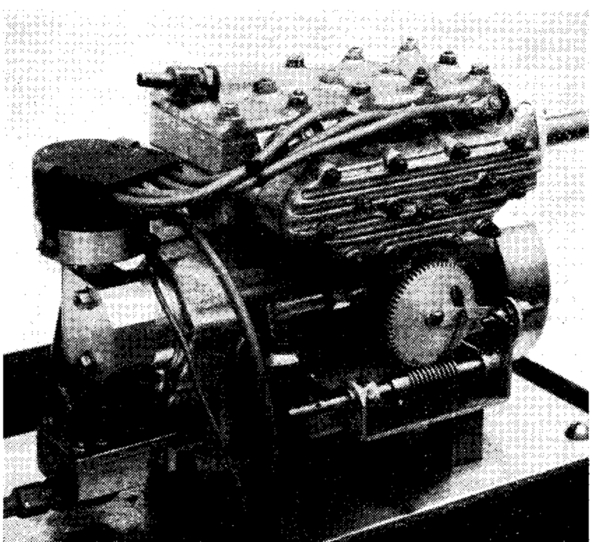
Mr. F. G. Wills's working model Stevens motorcycle

engine by the same constructor is the 10 c.c. horizontal 2-stroke engine, in which the two pistons are rigidly connected by a piston rod operating through glands, so that they both move in the same direction. A die-block in the centre of the rod is used to form a slide crank, and motion is transmitted to the crankpin through a ballrace fitting the groove of the die-block. The spaces on the underside of each piston are used as compression spaces, as there is no crankcase displacement. Although the results so far obtained with this engine have not been particularly good, it deserves notice as a very interesting and original example of experimental design.

Several examples of home-constructed engines installed in boats were shown on this stand, including the very interesting horizontal water-cooled engines in the two tugs *Ida* and *Canda*, and the veteran motor launch *Leda III* by Mr. A. W. Vanner, of the Victoria club.

Another exhibit in this class on the M.P.B.A. stand was an early o.h.v. 30 c.c. engine by B. Miles, of the Malden Society.

The London S.M.E.E. presented two outstanding i.c. engine exhibits, firstly, the Stevens motor cycle by G. F. Wills, which, it may be remembered, was awarded a silver medal in last year's MODEL ENGINEER Exhibition. This is one of the few examples of a true representative scale model, being also a very successful working model. A good deal has been done to the motorcycle and sidecar chassis since last year, the former being now practically complete, and it would appear that little more remains to be done, beyond fitting the sidecar body. The photograph shows how faithfully the character of the prototype has been reproduced, and further



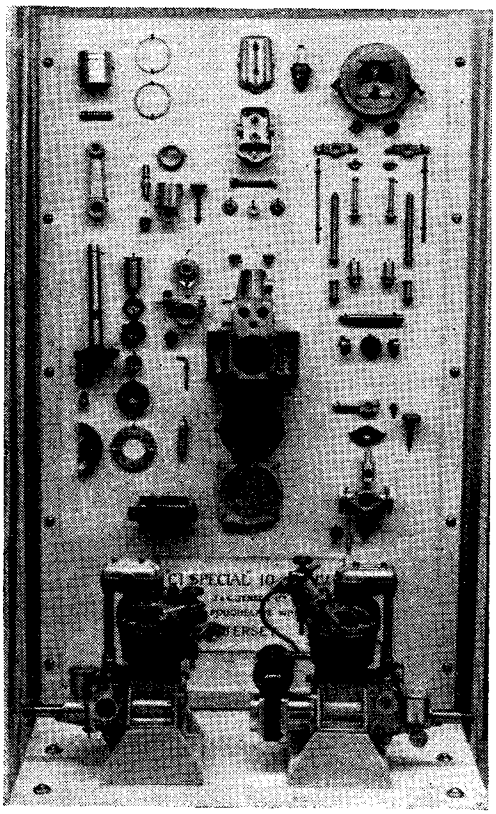
Mr. P. A. Cummins's "Seal" engine

comment by us on this very fine model is superfluous.

The second i.c. engine exhibited on this stand was the equally interesting model lorry by Mr. L. O. Gibbs, of Addiscombe, and as this engine was illustrated on the cover picture of the September 1st issue, and also described in the Smoke Rings paragraph relating thereto, this also calls for no further comment.

A Find

The stand of a society specialising in experimental electronics would be the last place one would expect to find i.c. engines, and it is all



The display of 10 c.c. o.h.v. engines and parts by Messrs. J. & G. Jensen

the more remarkable, therefore, that one of the finest exhibits in this class was to be seen among the apparatus displayed by the Radio-Controlled Models Society. This consisted of a "Seal" 15 c.c. engine which has been produced to serve in the role of "guinea pig" for experiments with radio-controlled vehicles and watercraft. This engine has been built by Mr. Cummins, of the above Society, who states that it is a first effort in the construction of i.c. engines, and with the exception of some minor modifications, such as the gearbox for the distributor and pump shaft, which was arranged to accommodate available gears, it has been built entirely according to the original specification and instructions.

Operation

For the purposes of the particular form of control used, the normal throttle lever is replaced by a worm gear which operates the throttle through a lever having a certain degree of lost motion, for the purposes of slow running adjustment, and the worm which engages with this wheel is driven through a flexible shaft from a repeater motor which is step-controlled from the radio receiver. The performance of this engine is everything that can be expected from a well-behaved engine. It starts very readily and fires evenly at all speeds, having a perfect tick-over at a speed sufficiently low for all practical purposes, and very rapid acceleration when the throttle is opened. The exhaust is cool, thanks largely to the interchange of heat in the manifold, and is almost inaudible at tick-over speed. A silencer seems to be quite superfluous. The lubrication system of the engine appears to work quite well, and requires absolutely no attention, beyond keeping up the level of oil, while the circulating pump supplies just sufficient water, maintaining the jacket temperature slightly below boiling point. Many i.c. engine enthusiasts have made pilgrimages to this stand to witness demonstrations of this engine, and the results which have been obtained with it constitute yet another piece of concrete evidence of the practical success of THE MODEL ENGINEER i.c. engine designs.

Trade Stands

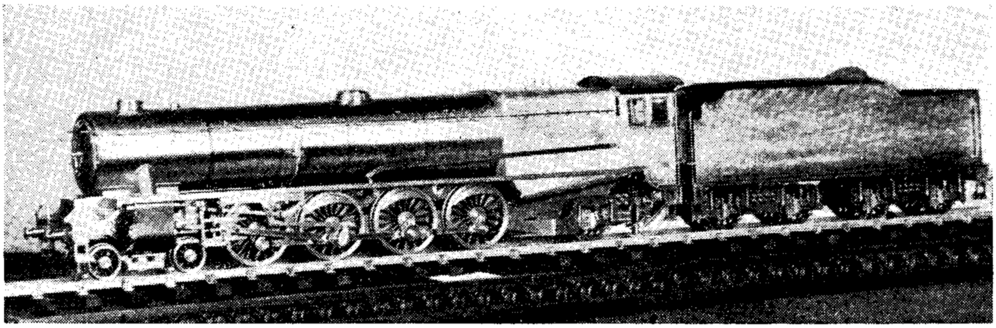
Apart from the examples of small c.i. engines which were featured at several stands, and which are now so well known that detailed description is unnecessary, the main interest centred round two trade exhibits, that of Craftsmanship Models Ltd., of Ipswich, and J. & G. Jensen Ltd., of Jersey. The former featured sets of castings for several well-known engine designs which have been published in THE MODEL ENGINEER, including the "Kestrel," "Seal," "Ladybird" and the "Craftsman Twin," the latter being also available as a completely finished engine. The quality of the castings used in these engines is at least equal to that of any small castings which have yet been available. A preview of a new twin-cylinder 4-stroke engine design, the 10 c.c. "Seagull" was shown, but as it is hoped to give a full description of the engine later, little need be said of it at this stage.

Messrs. Jensen's exhibit consisted of a stand on which were mounted two complete 10 c.c. o.h.v. engines and a complete set of machined parts. This engine is a totally new design, having very up-to-date features, including completely enclosed rockers and push rods. It is available with either coil or magneto ignition, and as the one and only example of a 4-stroke racing engine so far in production, it will be welcomed by many enthusiasts as a refreshing change from the monotony of the 2-stroke. In this case also, it is expected that further details of the design will soon be available.

*The Model Locomotives

AND now let us be a little more critical and add some remarks about the faults which model locomotive builders still seem very prone to make. The true lover of the steam locomotive, when he builds his miniatures for the sheer delight of building, usually imagines, or tries to imagine, what his engine would be like in full size. The great majority of miniature locomotives seem to support this idea ; and yet there are many which possess features that could only be the result of either hurry, which tends to induce carelessness, or to lack of observation. There is a danger that, in some cases, too much emphasis tends to be laid upon the fact that a miniature locomotive can never have a crew upon its footplate, so arrangements which, in full-size, are merely incidental to the operation of the engine can be ignored. On the other hand, footplate details, for example, must be made robust enough in miniature, to withstand the wear and tear to which they are subjected in miniature locomotives. Therefore, some kind of compromise is indicated.

We have already mentioned certain little faults that were noted in Mr. E. G. Rix's " Liberty " ; one or two others are worth mentioning, even if they do not affect the working of the engine at all. The nameplates have a somewhat clumsy appearance due, first, to their position on the smokebox being too high and, secondly, to the lack of even any suggestion of a border. At the moment of writing, we have been unable to recall a single full-size instance of a cast metal plate without some kind of a border. There is, of course, no necessity to be over-elaborate in such a detail ; but a bordered plate *does* look better finished. The riveting of the tender body, cab sides, etc., is first-class in this engine ; in fact, it is so good as to suggest that just as *strong* a job, but of better appearance, would have been possible from such an expert riveter !



R. D. Rowell's " O "-gauge coal-fired 4-8-2 locomotive, in which a great deal of very fine workmanship could be seen.

Mr. J. F. Bruton's 5-in. gauge 0-4-0 saddle-tank locomotive is spoiled by the plate-work of the cab and bunker showing visible signs of being crumpled. The painting too, even if it is merely an all-black, semi-matt coat without any decorations, could be much smoother on its surface ; this would add a great deal to the general effect, and we feel that this very pleasing little engine is well worth repainting, with a spray-gun if possible.

Dr. M. G. Baker's 3½-in. gauge 0-4-0 saddle tank, on the other hand, seemed rather to lean to the other extreme, suggesting that the finish is really too good for such an engine. We are quite prepared, however, to give Dr. Baker the benefit of the doubt on this particular point. The lining is a little " rough " in places, which may be due to lack of practise in the art.

Mr. A. J. Webb's " Hielan' Lassie," which he described as " slightly modified to taste," has only a single chimney instead of a double one, and the general effect is very striking. It is, of course, strictly a matter of taste, and we know that there are many readers who will disagree with our opinion that Mr. Webb's alteration is a great improvement. But, somehow, we feel that his chimney might be even better ; at present, it seems to lack a certain degree of firmness of outline. We suggest that a true Gresley chimney would meet the case very well.

Let us now take a closer look at Mr. A. C. Perryman's " Brightonised Maisie." Two things strike one immediately ; one is that the chimney is a poor reproduction of its prototype, and the other is that the painting is incorrect. The former should be easy to correct, but the latter may be due to some lack of the proper information, because we have met other " Brighton "

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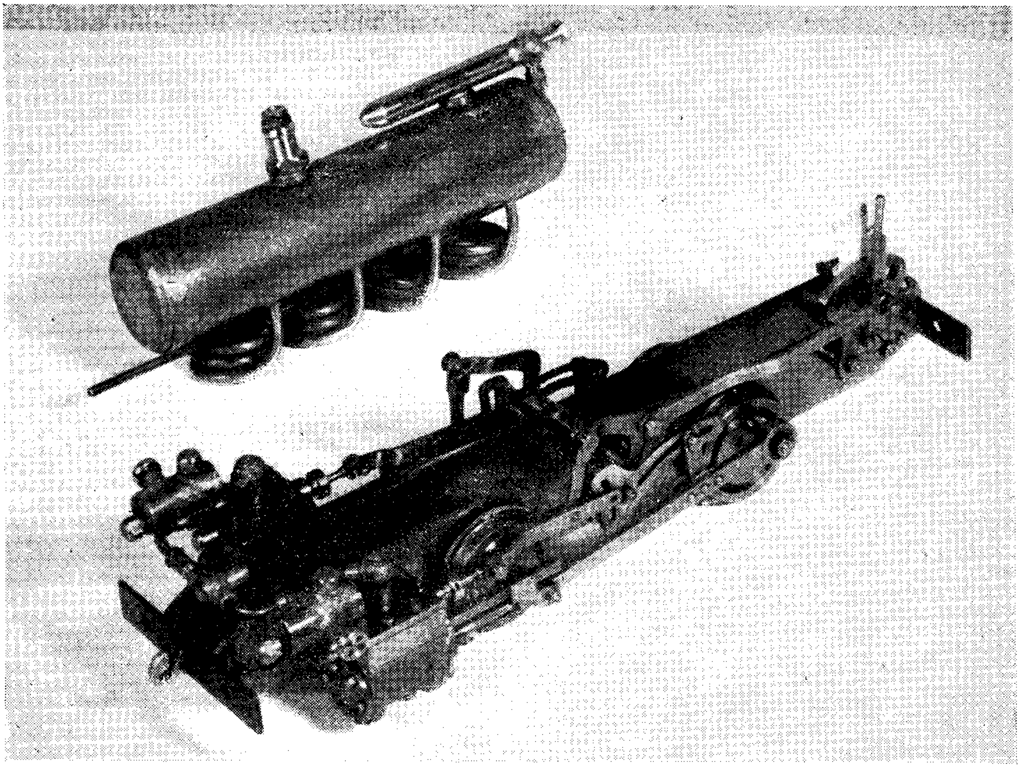
*Continued from page 320, " M.E.," September 8, 1949.



An experimental locomotive chassis and boiler for "O"-gauge made by Mr. T. W. Geary. It embodies a special valve-gear and a novel arrangement of circulation tubes in the boiler

models which exhibit the same errors. While the main colour for a Marsh engine was umber-brown, which is fairly well represented by Mr. Perryman, tenders, tanks, and cab-sides were bordered with a darker shade of brown, which was probably obtained by mixing umber and black. Wheels, also, were painted the *darker* brown, and had black tyres and axle-ends. Valances, foot-steps and the like were painted unmixed umber and were bordered with a narrow black stripe having a straw-coloured, or in the case of top-link express passenger engines, a gilt line on its inner edge. Tender frames were black with straw-colour or gilt lining. Repainted in this manner, Mr. Perryman's engine would be vastly improved; but the lining should be much finer than it is.

Dr. M. G. Baker's 2½-in. gauge G.W.R. "King" seems to misfire almost everywhere, and we would like to know a great deal more about it. Like so many other miniature "Kings" that we have seen, it fails completely to suggest that very striking, majestic massiveness which is so characteristic of the prototype. Space will not permit of this matter being more fully discussed here; but we hope we may have an opportunity some time in the future, to deal with it generally. For the present, suffice it to say that the prototype "Kings" have something that the miniatures have not.

Mr. H. Park's "Hielan' Lassie" is a good average example of this popular engine; but we do not feel that it is improved by having its brass double chimney highly polished. The point here is that no prototype chimney is of cast brass, and though, in a miniature, the material does not matter one iota, a *polished* all-brass chimney looks incongruous.

Mr. W. H. Brittain's 3½-in. gauge "Royal Scot" has already been mentioned; but there are just a few other comments we would like to make. It seems a waste of time and material to fret out the numbers and initials L.M.S. and sweat them on to the plate-work; they are *painted* on the prototype, and a similar method in the miniature would be far less trouble and more correct.

Here we must leave this necessarily brief review of the larger locomotive exhibits. As usual, they have provided a great deal of food for thought, and they have shown that the enthusiasm for building them is as keen as ever. We have enjoyed examining them and writing about them, for both occupations are such that they can never lose their fascination, any more than can the steam locomotive itself.

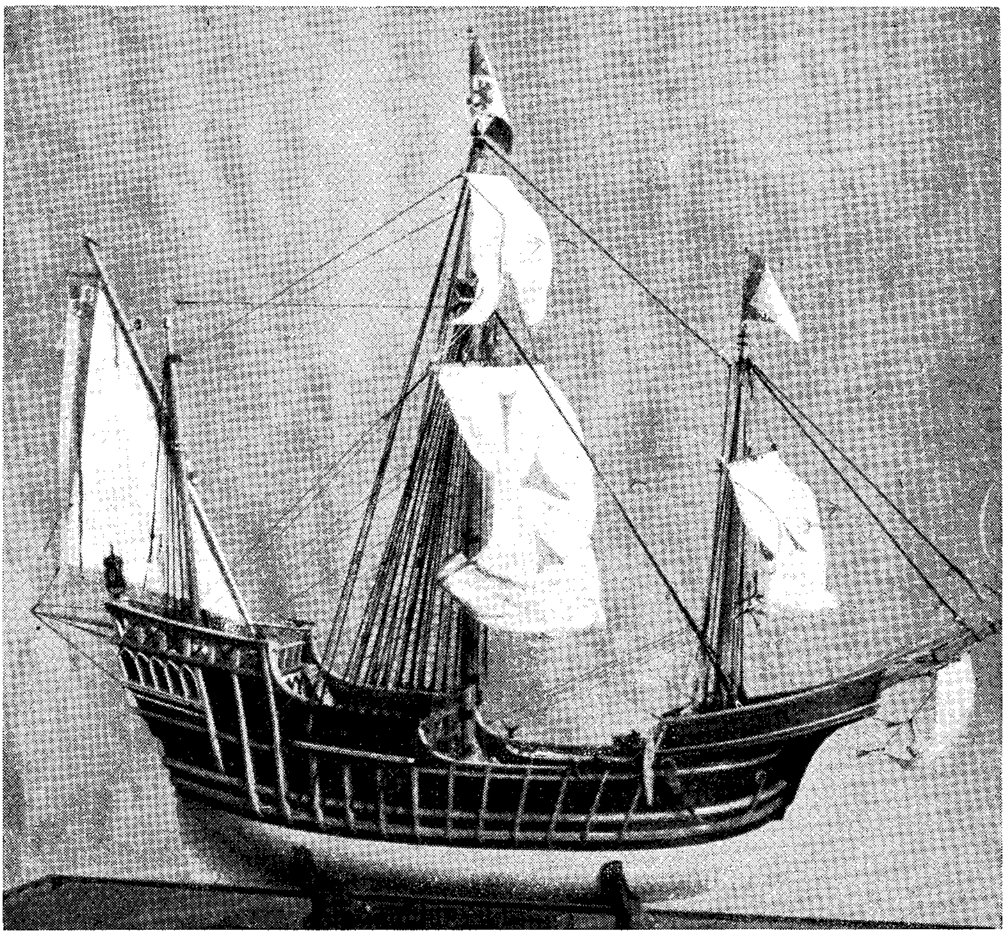
*The Ship Models

at the "M.E." Exhibition

CONVERSATION with numerous visitors throughout the period of the Exhibition confirms our first impression that the general standard of ship modelling as shown by the examples on view is definitely on the up-grade. Admittedly there were some examples of crude workmanship, but their number was fewer than usual. Some visitors suggested that we should have a selection committee to exclude all models below a certain standard. There is certainly something to be said for this idea, especially in view of the limited stand space at our disposal, but so far we have kept the competition side of the Exhibition open to all comers. The newcomers who are keen will soon see the difference between their models and the better ones, and the effect of such a comparison can only be to encourage exhibitors to improve their standard.

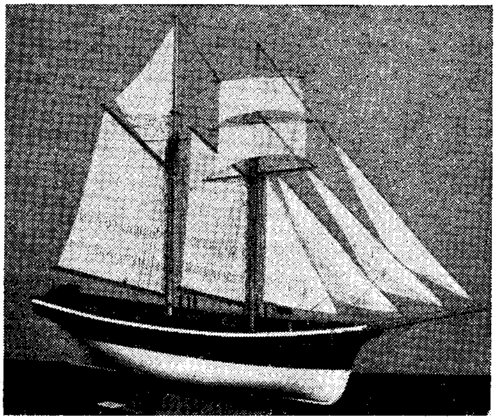
The cup winners in both the steam and sailing ship section were outstanding examples of fine craftsmanship, and not only of fine craftsmanship but of careful and intelligent research work and

*Continued from page 347, " M.E.," September 15, 1949.



Mr. Field's model of a 16th century Spanish carrack; a superb example of ship modelling

design. The stern lantern and the flags on the 16th century carrack, the sailing ship cup winner, to name but two items, were beautifully made. The topsail schooner *Columbine*, which was the runner-up for the championship in the sailing ship section, was notable for its beautiful, clean work, the woodwork about the decks being especially well done. The general effect was somewhat marred by the deck which appears to have been made of Bristol board with the planks marked out in ink. It would have been very little trouble at this scale to have laid the decks in wood and the general effect would have been greatly improved if this had been done. The East Indiaman by F. J. Morley of Hawkhurst seemed to grow on one as the days passed, the beautiful black and white effect being especially pleasing. The detail in this ship was somewhat simplified, but it was simplified very intelligently and the general effect was very well preserved.



A lovely model of a topsail schooner made by Mr. C. J. Clarke, of West Bromwich. This was a close runner-up for the Championship Cup

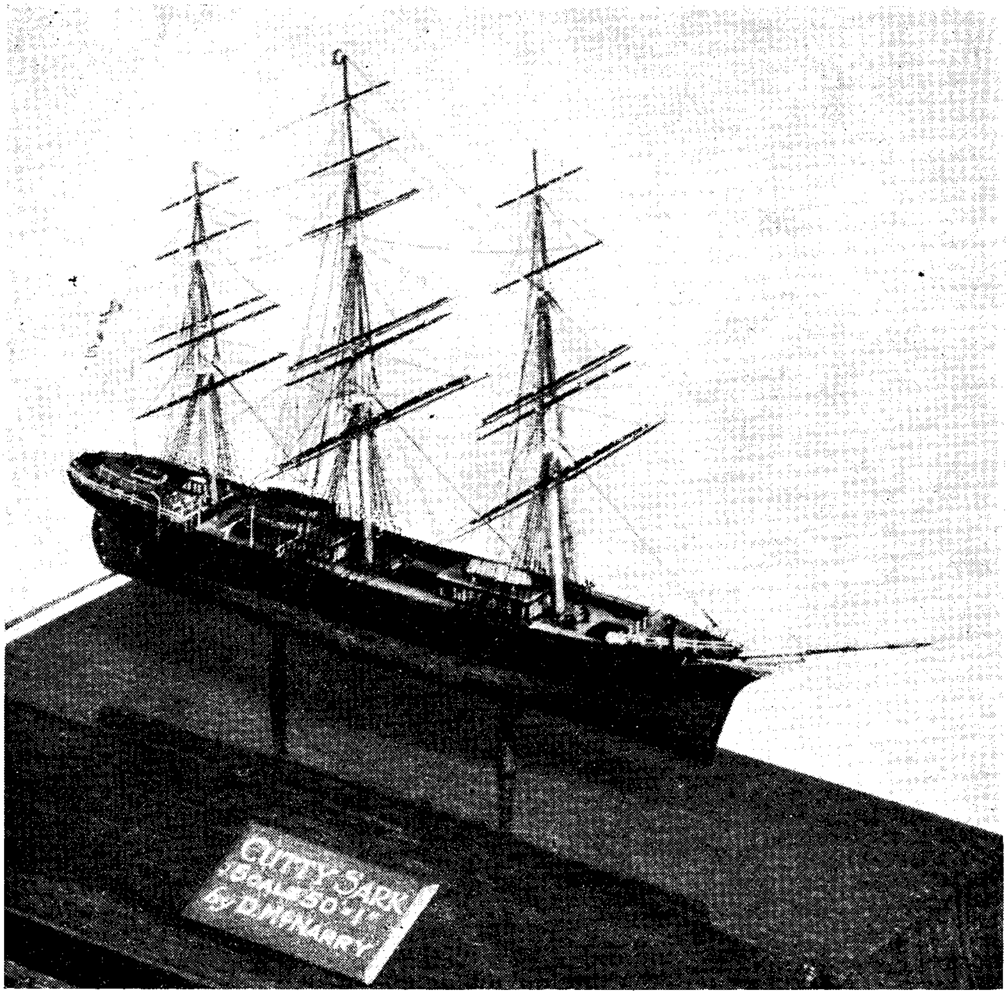
We were pleased to see the examples of working model yachts and sailing ships this year. Out of the seven entries that materialised, six of them received awards, and the awards were well merited in every case. The amount of detail included was in most cases very appropriate to the requirements of the working model. Nothing was too delicate and very little was omitted. We would have liked to have seen an example of what we call the model yachtsman's approach to the rigging, by which we mean the simplification of the orthodox rigging for the sake of quicker handling on the pond. The 6-metre yacht by R. C. Blyth of Gerrards Cross with its special method of construction embodying the use of thin 3-ply attracted a considerable amount of attention. We will probably hear more of this method as it becomes better known.

Some of the working model steam ships were rather heavy in their details and the lifeboats might have received more attention in several cases. The lifeboats on even the championship tug *Chieftain* by T. Fletcher of Colne could have embodied more detail with advantage.

The miniature section this year was very strong and on the whole of a very high standard. We have already spoken of Mr. McNarry's *Cutty Sark* and *Golden Hind*. Indeed, there is little one can say about such perfect examples of miniature modelling. The model of H.M.S. *Crossbow* by J. T. King of Croydon, embodied some incredibly fine detail work. Being a waterline model, we think this should have been set in a sea of some sort, as to put it on a piece of polished wood tends to destroy the realistic appearance of the model. J. L. Bowen's model of T.S.S. *Awatea* was a very clean piece of work. The model had a lovely sheer and was beautifully set in a very realistic sea. We are inclined to think that 100 ft. to 1 in. is too small a scale for most models, and in these two cases, for example, if the same degree of skill and craftsmanship had been expended on a model to twice the scale, the result would have been very much more impressive. The scale of 100 ft. to 1 in. is, to our minds, more suitable for those who wish to make a large number of models for the purpose of comparison, rather than for the highly skilled miniaturist. Such details as railings and rigging become practically impossible at 100 ft. to 1 in., but, given sufficient skill on the part of the modeller, can be introduced very effectively at 50 ft. to 1 in. This point is very well demonstrated in Mr. McNarry's models which are to the larger scale. Mr. J. A. Borrowman's model of a Ningpo fish transporter showed the possibilities of this type of craft. The under-water lines of junks are often more beautiful than we realise and the setting of the fully battened sails gives an extremely graceful line from most points of view. All this makes for a very good looking model, and once the eye gets accustomed to the somewhat bizarre features which are present, one begins to appreciate the suitability of this type of craft as prototypes for modelling.

We were unfortunately unable to find space for R. C. Anderson's large model brigantine in our loan section as we had hoped. It may, however, be seen in our office window at Great Queen Street. One of the most interesting models in the loan section, however, was the model of H.M.S. *Renown* of 1895. Models of this period are somewhat scarce, and this particular model was very well proportioned and very fully detailed. It was obvious that it had been made by someone with a very intimate knowledge of the ship. The woodwork was not painted and the metal work was left in dull metal plating, but while we missed the smart colouring of the battleships of that period, the workmanship in the model made up to some extent for what it lacked by not being painted.

The ship model stands were very busy throughout the Exhibition and many names of prospective new society members were added to "Jason's" book. Mr. Marsh, working on his $\frac{1}{8}$ in. scale *Thermopylae*, was never without his interested audience, and actually did more in the way of answering questions than work on his model. The Model Yachting Association stand attracted a good deal of attention; a beautiful new 10-



Model of "Cutty Sark" by Mr. McNarry. The hull is just over 4 in. long and the detail work is incredibly small

rater was on view, as also were two Marbleheads and a 36 in. yacht; but the exhibit which seemed to attract most attention was that of two examples of the Vane steering gear. The stand attendants had a very busy time explaining the working of these. This gear is rapidly gaining in popularity and its efficiency was rather strikingly demonstrated at the recent regatta at Fleetwood, when nine out of the twelve finalists were noticed to have been fitted with this gear.

For the Bookshelf

The Steam Locomotive in Traffic, by E. A. Phillipson. (London: The Locomotive Publishing Co. Ltd.) Price 17s. 6d. net.

We have been favoured with a copy of this new book by an author who is known for the scrupulous care with which his work is prepared. Its subject is treated in the most thorough manner, covering every phase of the problem of obtaining the maximum amount of revenue-producing work from a steam locomotive.

Departmental organisation; the layout, equipment and organisation of locomotive sheds; water supplies and treatment; fuels; lubricants; storekeeping; boiler washing; shed grades, work and establishment; repairs and maintenance; engine cleaning; failures and breakdown equipment; rostering of enginemen and depot correspondence, are each given at least a chapter.

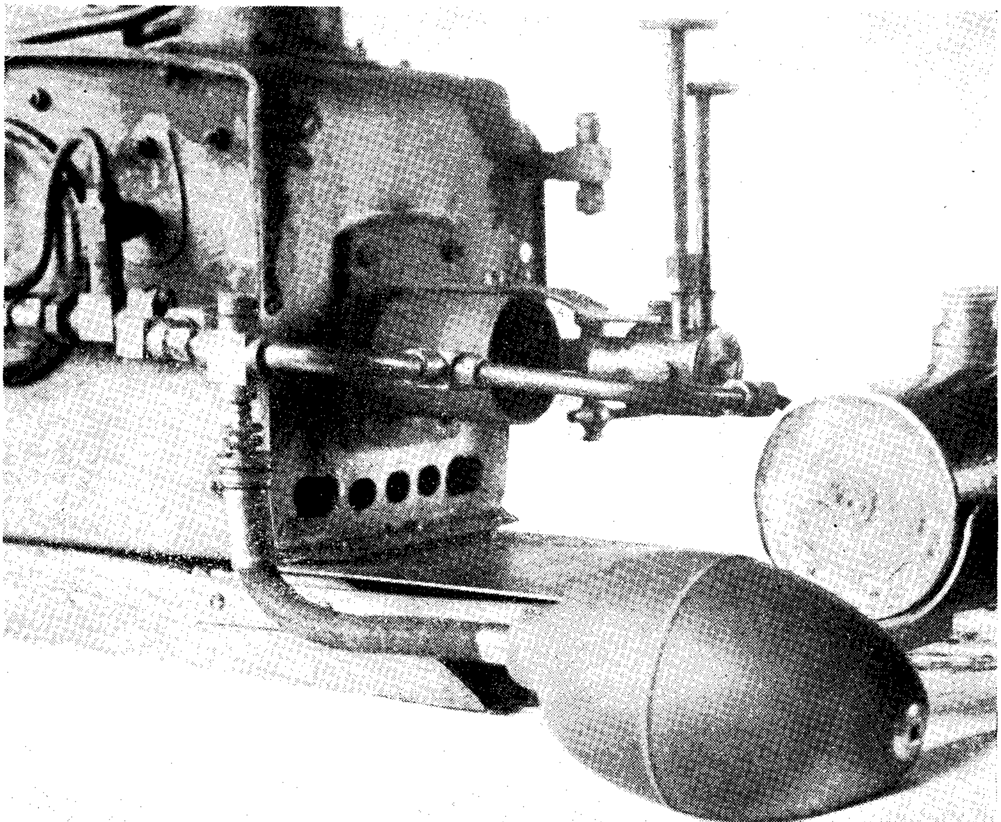
The numerous illustrations in line and half tone, some of them on folded plates, are thoroughly appropriate. The book should be in the hands of all who are in any way interested in locomotive operation.

*UTILITY STEAM ENGINES

by Edgar T. Westbury

SOME experimenters have encountered combustion troubles with atomising burners, and some hints on this subject may be appropriate. It should be remembered that the atomiser in itself is not a complete burner ; its function is simply to produce a combustible spray of fuel, which must then be mixed with sufficient air to support combustion before it is ignited. In the firing of full-sized boilers, the atomiser is usually fitted in the centre of an air inlet, which is sometimes of complex form to promote air turbulence, and often force-fed with air by a blowing fan. These measures are not readily applied in a small steam plant, but neither are they absolutely essential unless fuels comparable to those used in full-size practice have to be consumed.

In many cases it has been found that simply directing the spray into the flue or firehole door of the boiler will induce sufficient air to follow it to produce good combustion ; but often this simple measure will not suffice, and the air inlet must be designed so that the spray has the maximum injector effect. The Blakeney boiler had an air tube attached to the firing port of the casing, which served this purpose quite well, but in some cases it may be found better to build an air tube, like the flame tube of an ordinary blowlamp, on to the atomiser itself, and there is scope for experiment in the design of the tube and its air ports. Inefficiency in the air supply arrangements may result in incomplete combustion, with formation of smoke and soot ; in some cases the flame may strike back through the firehole door, though this is more often caused by inadequate uptake area, or back pressure



Starting arrangements as used with Blakeney steam plant, showing the rubber bulb used to supply air pressure

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**Continued from page* 328, " *M.E.*," *September* 8, 1949.

due to sudden draughts down the uptake.

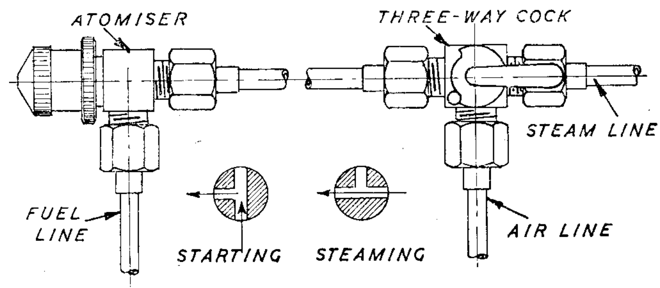
A common trouble is blowing out of the flame, which may be caused through excessive supply pressure, or wet steam passing through the jet. If this is persistent, it may call for redesign of the system or some method of ensuring dry steam, but an occasional blow-out is generally easy to deal with by placing some refractive substance in the furnace in the path of the flame, such as a few small lumps of coke, or broken asbestos " coals " as used in gas fires. These become incandescent and should the burner momentarily be extinguished, will promptly relight it. A slab of firebrick is sometimes placed in a suitable position for the full heat of the flame to impinge upon it, for the same reason. Such measures will often improve combustion efficiency, and their radiant heat is nearly always beneficial in helping to maintain even furnace temperature. They may also be used to counteract the problem of excessive flame length, which is often troublesome in small furnaces.

Bad combustion is sometimes caused by imperfect atomisation of fuel, which can usually be detected by a lack of homogeneity in the flame or yellow flecks in it. But the flame from an atomising burner hardly ever looks so intense as that from a blowlamp, neither is its sound so awe-inspiring, so one should not be led to think that the burner is a failure on that account.

Starting Up

Some users of steam plants object to atomising burners on account of imagined difficulties in starting and raising steam. This is largely a fallacy ; starting such burners need not be any more difficult than with any other method of firing and may in certain circumstances be much simpler. It is necessary to arrange some method of auxiliary pressure supply, which may be obtained from a cycle pump or football inflator, with a steadying reservoir—an air tank or bladder—interposed to ensure a constant discharge from the atomiser. In the Blakeney plant, a rubber bulb as fitted to toilet sprays was found quite adequate, and called for no very violent exertion in use for the short time while raising steam (about two minutes). The burner will light up immediately from cold, using a taper or a wisp of oily rag ignited in the furnace—in most cases even this is unnecessary, as a match applied in the right spot will do the trick.

The arrangement for the auxiliary starting air supply is shown in the drawing ; it consists simply of a three-way cock connected in the supply line in such a way that the burner can be fed from either the steam or air pipe. It is, of course practicable to start on steam from an auxiliary boiler if this should be available. As soon as steam shows in the gauge of the boiler which is being fired, the cock can be switched over to the running position and the auxiliary supply disconnected. I have dealt in some detail with the possibilities of atomising burners, as I have felt for a long time that research on this subject is a long time overdue in model engineering circles. It is, of course, evident that this method of firing involves its own problems, and success may not be attained at the first attempt. But while it may not be " dead easy "—nothing ever is that is worth doing—I am convinced that it offers better possibilities for high ultimate efficiency than any other liquid fuel burner, and is free from many troubles and limitations which are inseparable from the latter.



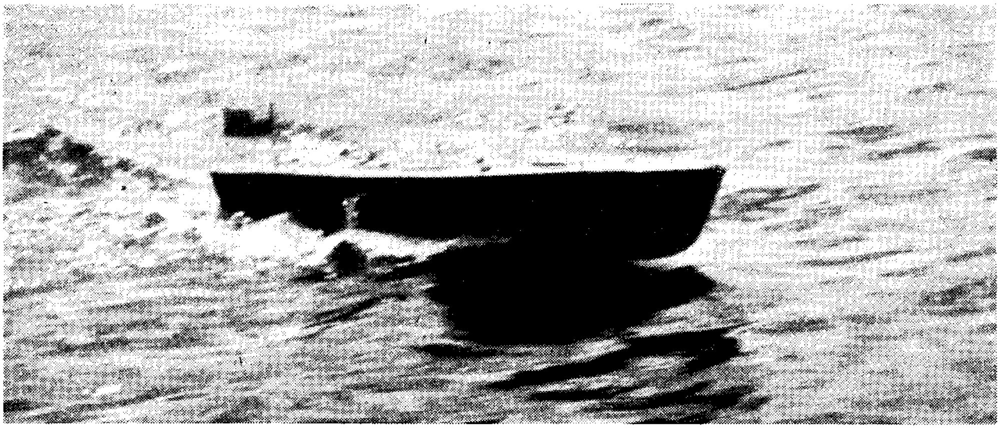
Arrangement of auxiliary air starting system for atomising burner

The other type of atomising burner which I mentioned—the one which resembles an i.c. engine carburettor—also presents some very interesting possibilities, but I have not yet had time to experiment with it to any serious extent, and any comments upon it at this stage would therefore be largely conjectural. But do not forget that it has been used with success by no less an authority than Abner Doble, whose judgment in the selection of a burner for his remarkable steam car—I think all will agree—can be confidently relied upon.

Gas Firing

In the case of stationary steam engines and boilers used for test purposes, gas firing has many obvious advantages, being cleaner, more convenient and also more economical than most forms of liquid fuel burners. There are few combustion difficulties likely to arise with gas, as it is so easily mixed with air on the bunsen principle, and whether natural or forced draught is employed, it is only necessary to ensure that sufficient air is supplied for the complete combustion of the fuel. In most cases a burner, similar in essentials to the ordinary gas ring, will give good results, though it may be necessary to modify the shape of it to suit the furnace, such as by using one or more horizontal tubular burners with holes or slits for the actual burner jets, and arranging the gas jet and mixing tube in a similar manner to that of a blow-lamp burner. Some experiment with the areas of the gas jet and air inlets may be called for to get the best results. A plain bunsen burner of the type used in workshops and laboratories forms a convenient substitute for a torch type of burner. Much the same applies when using liquefied gas, such as Butane or Calor gas, but in this case very much smaller gas orifices are used, and a fine adjustment control valve is desirable. It may be remarked here that small gas containers

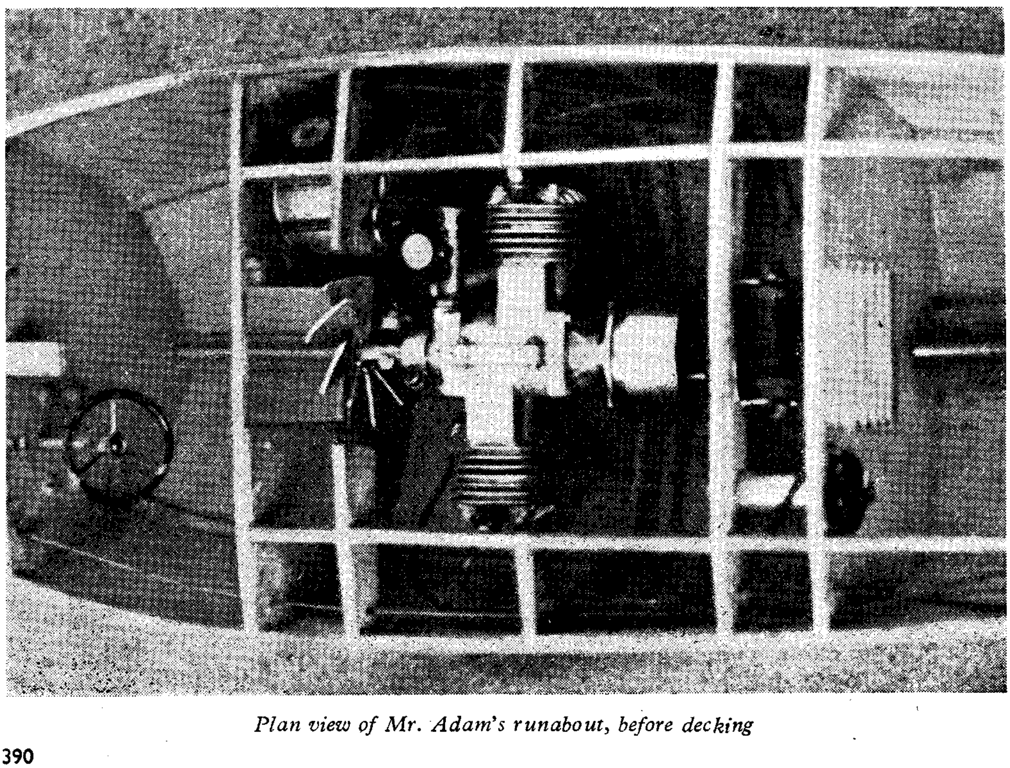
(*Continued on page* 391)



Silencing the Craftsman Twin

IN conversation with Mr. Edgar T. Westbury some time ago I mentioned that I had installed a Craftsman twin 10 c.c. engine in a 30-in. hard-chine cruiser hull, and had used a rather unusual under-water exhaust system in connection with this engine. At his request, I am submitting the photographs of the installation and also sketches showing the details of the exhaust system.

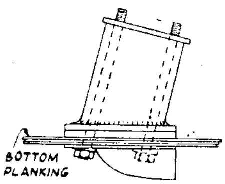
As most readers are aware, the exhaust ports of the Craftsman twin engine are on the underside when the engine is installed in its normal position, and this location makes it somewhat of a problem to install the normal form of exhaust pipe and silencer. I decided, therefore, to take the two exhaust pipes straight down through the bottom of the hull and to fit small deflectors on the outside of the hull to direct the exhaust



Plan view of Mr. Adam's runabout, before decking

towards the stern. The exhaust pipes consist of 16-gauge copper tube flattened to an elongated section and with 16-gauge flanges brazed on. Long studs are fitted to the exhaust flanges on the engine and taken inside the exhaust pipe through to the outside of the hull where they are used to secure the external copper plate.

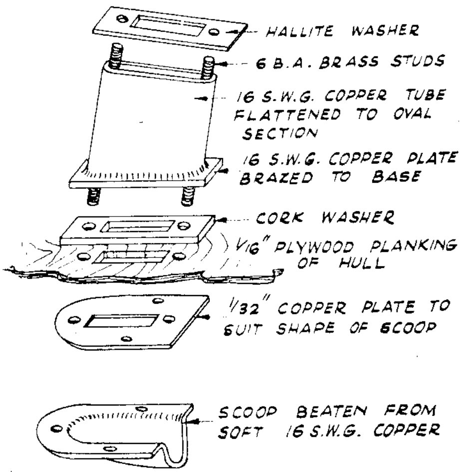
To produce a gas-tight seal, a Hallite washer is used on the engine flange and a cork washer between the lower pipe flange and the hull. The deflector or scoop is hammered from soft 16-gauge copper and attached by three screws to the outside of the hull. Apart from the effectiveness of the underwater exhaust in acting as a silencer, the discharge of the gas under the hull appears to improve its planning qualities, and, therefore, its efficiency.



The engine is an absolute delight to handle, and not only starts instantly, but is flexible to a degree that I had not expected. Though its power does not quite equal that of the 10 c.c. Super Cyclone, its low centre of gravity and easy handling makes it a most attractive unit for fitting into scale model general purpose boats of all kinds. When running, it is not only vibrationless, but thanks to the underwater exhaust, practically dead silent—only a subdued hum of machinery can be heard.

The only alteration to the engine which was found to be desirable is the fitting of a longer intake tube bringing the intake up to deck level, and the removal of the standard air shutter, which appears to improve the power output.

The photograph of the boat under way shows the excellent planing angle and riding qualities of the model under quite adverse weather conditions. Unfortunately, the hull appears black, due to its dark mahogany finish.

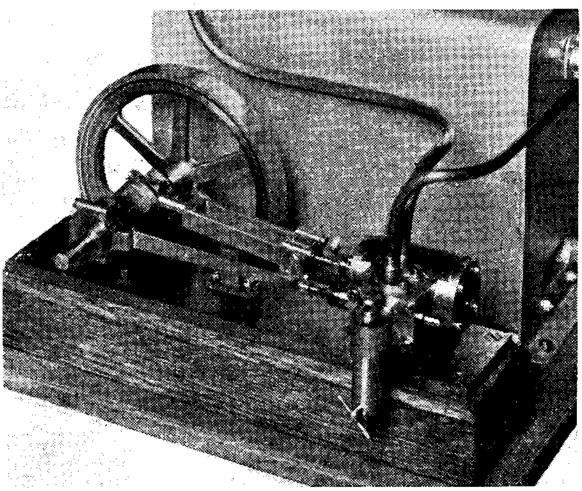


Until I am able to time the boat over a set course, I cannot decide definitely whether any increase of speed is obtained with underwater exhaust, but as this is achieved in full-size boats through the reduction of skin friction, it should apply equally to the model.—H. A. ADAM.

Utility Steam Engines

(*Continued from page* 389)

intended for use with portable blowlamps, but readily applicable to many purposes in connection with small steam plants are obtainable from Dex Industries Ltd., Weedex Works, Edwin Road, Twickenham, Middx., and although I have not made any tests with this form of fuel I have very little doubt that it would form a very efficient substitute for liquid fuel burners in model marine steam plants.



The ¾ in. × 1⅛ in. horizontal steam engine by Messrs. A. J. Every

Steam Engine Castings

I am informed by Mr. A. J. Every, of 33, Williams Road, Ealing, W.13, that he is now able to supply castings and blueprints for the horizontal steam engine, which was described in the issue of THE MODEL ENGINEER dated March 6th, 1947, by R. E. Mitchell. This is a simple slide-valve engine of ¾-in. bore by 1⅛-in. stroke, designed by Mr. R. W. Dunn.

(*To be continued*)

The Marshall Five-Ton Steam Tractor

Another Addition to the "M.E." Blueprint Service

by W. J. Hughes

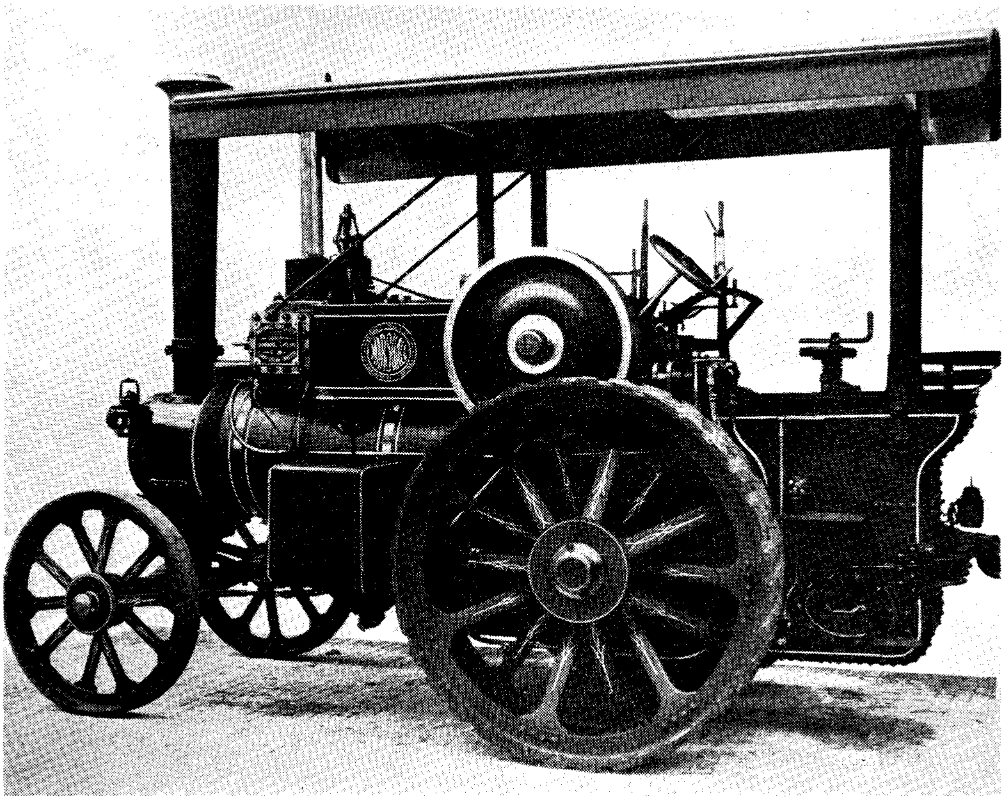


Photo by] [*R. G. Pratt*

Fig. 1

THE latest additions to the traction-engine blueprint service concern the Marshall five-ton steam tractor, which was really a small edition of a road locomotive, being designed for road haulage rather than general-purpose work. There were both single-cylinder and compound versions, and the latter was the more common. The only difference between them was in the engine itself, and the remaining features—boiler, gearing, wheels, etc.—were identical.

Both axles were sprung, and there were two speeds, fitted with a simple but ingenious interlocking device to prevent both pinions being put into mesh simultaneously.

Because of the comparatively small size of the prototype, I have made the drawings to 2-in. scale. This would give a model comparable in size to a $1\frac{1}{2}$-in. scale road locomotive, but all the components would be within the capacity of an ordinary $3\frac{1}{2}$-in. lathe. The largest items, the hind wheel tee-rings, work out at $9\frac{3}{4}$ in. (full) diameter by $1\frac{1}{8}$ in. (bare) wide, and these can be swung in the gap, while if rubber tyres are to be fitted, the size of the rings is appreciably reduced.

The single-cylinder tractor is dealt with on Drawing No. T.E.7, and the *engine only* of the compound tractor is on No. T.E.8, since the remainder can be obtained from No. T.E.7. It is important to note therefore, that anyone wishing to build the *compound* tractor should obtain *both* drawings.

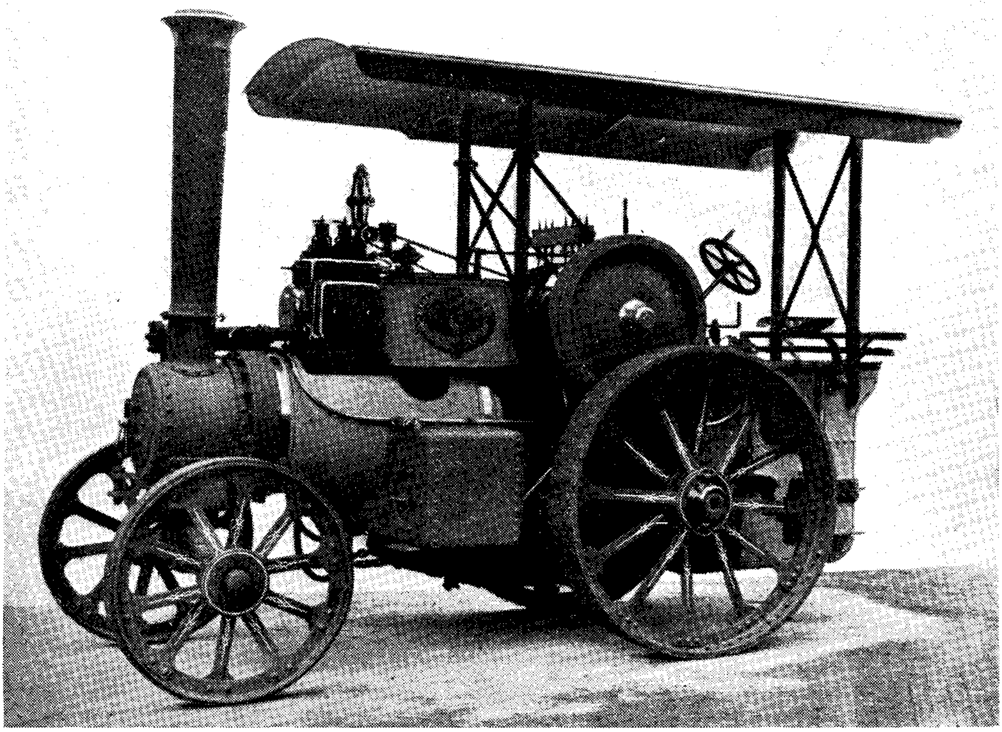


Photo by] [*R. G. Pratt*

Fig. 2

Either of the engines would make an excellent model to the scale drawn, with ample power for passenger hauling. For the latter purpose, the awning could be omitted if desired, but in my opinion this would spoil the characteristic appearance of the tractor. I would suggest, therefore, that the framework of the awning could be fixed, but with a detachable roof to be lifted off when the occasion demanded. The framing itself would not interfere with the driver's vision or his manipulation of the controls.

Both these sheets are based on official drawings supplied by Messrs. Marshall Sons & Co. Ltd., to whom we are further indebted for permission to reproduce.

PRINCIPAL DIMENSIONS :

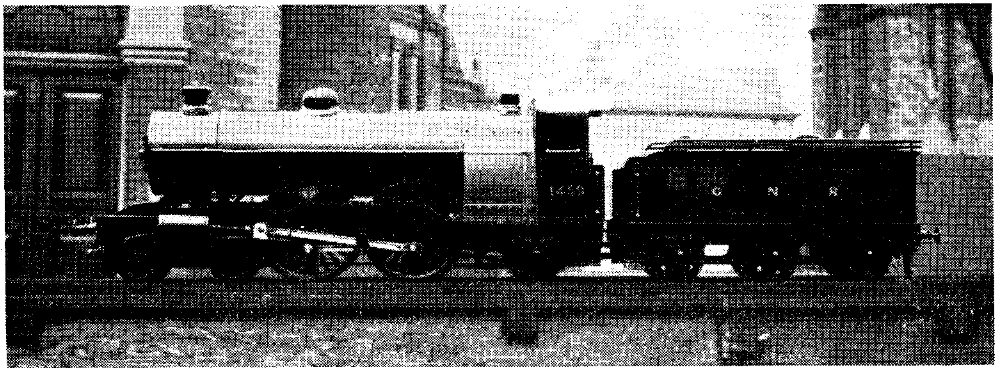
Length overall	14 ft. $3\frac{1}{2}$ in.
Width overall	5 ft. $11\frac{5}{8}$ in.
Height to top of chimney	9 ft. $10\frac{3}{4}$ in.
Hind wheels	5 ft. × $12\frac{1}{2}$ in.
Front wheels	3 ft. 4 in. × 5 in.
Flywheel (disc type) ..	2 ft. 8 in. × 5 in.

For the loan of the photographs reproduced herewith, I am grateful to Mr. R. G. Pratt, hon. librarian of the Road Locomotive Society. They are "official" photographs, and reproduced by permission of Messrs. Marshall.

Fig. 1 shows the compound version of the Marshall five-ton tractor. The foretank is lower on the left-hand side than on the right, to allow the belt to drive forward. Note pump behind flywheel delivering to feed-heater against chimney : injector behind hind-wheel delivers to side of firebox. This is a later type of tractor having the differential lock operated from footplate, therefore no pins are fitted to the hub on this side.

In Fig. 2 we see an early single-cylinder tractor, differing from the drawing in that all gearing is at the right-hand side, whereas on the drawing the final drive is at the left. Another difference is that the hind wheel has only a single tee-ring. Note roller on fore-tank to keep belt clear.

Drawing No.	Description	Price
T.E.7.	Marshall 5-ton steam tractor, single-cylinder on springs	5s. 6d.
T.E.8.	Engine only of compound Marshall 5-ton steam tractor	1s. 9d.



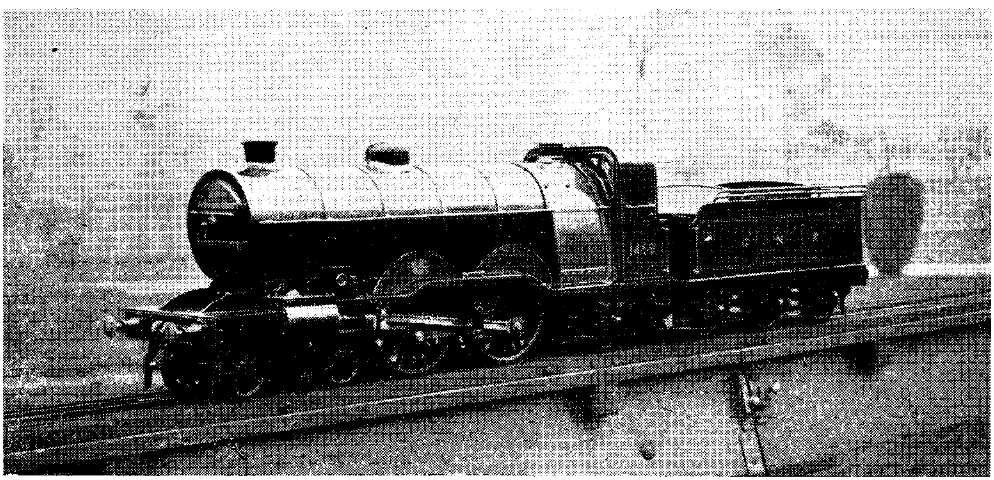
Improvements and Innovations

No. 5—Old Friends are the Best Friends

by "1121"

THE engine in the pictures is one that will be new to the great majority of the passengers whom we shall be carrying on the S.M.E.E. track in the future, but at the same time we hesitate in referring to her as an "innovation." Older readers may possibly recognise something familiar about the engine, and they will be right, for she is none other than the $3\frac{1}{2}$ in. gauge "Atlantic" which belonged to the late Driver W. H. Irvin, and which he used to run at every exhibition prior to his tragic death in 1937. Mrs. Irvin has kept the engine ever since that time until quite recently, when she decided to dispose of it to a member of the S.M.E.E. track staff. Although she was not quite the first engine ever driven by this particular member (this doubtful honour goes to Mr. J. C. Crebbin's "Cosmo Bonsor"), he did practically cut his teeth on her, and remembers with some pride that he was one of the few people, even at this early age, whom Bill Irvin would allow to drive his engine without supervision.

We think that many people will welcome this old friend back to her familiar haunts once more after so long an absence, and we venture to predict that she will show some of her newer friends a thing or two about passenger hauling for a little 'un, if she still performs as well as she did in the old days. We also believe that Mrs. Irvin is glad the engine has gone back to run over the same metals and be driven by the same gang she was accustomed to before her long rest.



Photos by] [*J. N. Maskelyne*

PRACTICAL LETTERS

Tube Bending

DEAR SIR,—In reply to Mr. Howard's letter published in THE MODEL ENGINEER, August 25th issue, in which he repudiates the method of annealing brass tube, quoted in my article published in THE MODEL ENGINEER on July 7th, I should like to point out that quenching in water, while offering no physical disadvantage, eliminates the waiting period and cleans the pipe by removing the scale. Mr. Howard should remember that the article was written for model engineers and not for works practice, although quenching is practised every day in one of Britain's most famous aero engine factories. As regards the use of resin for pipe filling, it is a matter of circumstance and opinion whether it is the best medium.

Yours faithfully,

Derby. J. W. TOMLINSON.

Standard V-belts

DEAR SIR,—With reference to the article in THE MODEL ENGINEER dated May 5th, 1949, covering attachments for a Champion drilling machine, I was struck by the dimensions of the V-belt mentioned on page 554, particularly with a view to the possible alteration of my own machine, and also on the possibility of obtaining belts of this section in longer lengths for direct drive to small machines from my countershaft. I may say that I have a number of these drives in what is known as " X " or " M " section belts, which are $\frac{3}{8}$ in. across the outside × $\frac{1}{4}$ in. thick and are far more satisfactory than round leather belts. I obtained a number of these from a friend of mine who is agent for another firm of manufacturers. I accordingly wrote to another friend in the Calcutta office of Messrs. J. H. Fenner & Co. (India) Ltd. and the following reply may be of interest to your readers :—

" With regard to our recent correspondence on the subject of our V-belt Symbol No. 1007 we would advise you that our Principals confirm that they did manufacture a belt with this number for a special customer but this has now been discontinued. The mould itself has been turned down to make mould 1017 from which they manufacture a belt of the same cross section, i.e. $\frac{1}{4}$ in. × $\frac{1}{8}$ in. but with an inside length of $12\frac{1}{8}$ in. This belt is used largely by the Ministry of Supply for cinematograph units. No other lengths are manufactured at present."

Yours faithfully,

Kanpur, India. E. ROYSTON.

Etching Steel

DEAR SIR,—With reference to THE MODEL ENGINEER dated July 28th, 1949, p. 121, a solution of iodine in aqueous potassium iodide is a more effective and much less unpleasant reagent for etching steel than nitric acid.

A convenient formula is : Potassium iodide, 4 grammes ; iodine, $1\frac{1}{2}$ grammes ; water, 25 millilitres (or 1 oz.). Any chemist will make this up for a shilling or so.

Either shellac lacquer (orange shellac 20, methylated spirit 100) or paraffin wax is a satisfactory " stopping " agent. The lacquer should be well dried before the etching operation—24 hours in a warm room, or baking (30 minutes on top of the electric toaster is convenient !). The wax should be heated to boiling-water temperature or (preferably) slightly higher, the article dipped, withdrawn quickly, drained, and cooled ; a thin film is best. Degrease thoroughly before lacquering or waxing.

The wax or lacquer film may be cut through with a scriber or the like. For flat surfaces, careful dropwise application of the reagent will form a pool of sufficient size, and it will " stay put " if not disturbed ; or the article may be immersed to the necessary depth in the reagent in a glass vessel (test-tube, screw-top tube from the chemist, fish-paste pot, jam-jar).

Yours faithfully,

New Eltham, S.E.9. F. G. WILLSON.

[A sample of a steel plate etched by this method, has been submitted for our inspection ; it was subjected to the action of the reagent for $1\frac{1}{2}$ hours, using wax stopping as described. The result shows that the method has distinct possibilities.—ED., " M.E."]

A German Outboard Motor

DEAR SIR,—I have recently acquired a small two-stroke engine which appears to be an outboard motor. It is approximately 1/25 h.p. and was made by Fichtel & Sachs, A. G. Schwarfurt, Germany. It is water-cooled and has a horizontal fore and aft cylinder with a vertical flywheel. The water is picked up by means of a swivelling retractable scoop which causes the water to circulate round the cylinder and silencer when the boat is in motion. The water is discharged through a protruding live-slotted spigot on the rear of the engine, and the propeller shaft (which is missing) apparently is screwed on to the spigot in a similar manner to a pipe union. The shaft, no doubt, has to be hollow in order to allow the cooling water finally to escape. The workmanship of the engine is of a very high standard and the design very compact, even being fitted with a screw-in dip-stick for the oil reservoir of the worm drive to the spigot, also an ignition cut-out for stopping the engine. The method of securing the engine to the boat seems rather vague, but there is a machined hollow horizontal socket on the rear of the engine which probably fits over a swivelling bracket to allow for the propeller to be lifted out of the water, also for steering purposes.

I wonder if any reader has seen or has any knowledge of a similar engine, as I am very keen on making it complete and putting it in working order.

Yours faithfully,

Birmingham. FREDERICK SMITH.

A Curious Old Gas Engine

DEAR SIR,—Referring to the article by Mr. Westbury in the September 1st issue of THE MODEL ENGINEER. If Mr. Westbury will consult a volume entitled "The Automobile," by Gerard Lavergne, and published in the year 1902, he will find on pp. 180 and 181, a description of the old engine, which is described as the Dawson Petroleum Motor and a sectional elevation is given. The sprocket on crankshaft is intended to drive a Dawson low-tension magneto, which was equipped with a contact-breaker, and supplied L.T. current to an induction coil; advance and retard was accomplished through the means of the epicyclic gear on the magneto.

The article states that up to 3 h.p. the motors were air-cooled through cooling fins on the cylinder, and greater powers were fitted with water jackets. The spiral type of gearing employed to rotate the piston sleeve is described in the article as helicoidal gearing.

Mr. Westbury would find descriptions of many weird contraptions of both motors and carburettors in "The Automobile"; one, for example, is the "Koch" having two pistons per cylinder, with combustion space between the two pistons. This arrangement gave a very good state of balance, and if I remember correctly the makers of the old Argyll car made an engine of this type and fitted it to their motor dog-carts.

If Mr. Westbury does not know the work referred to, I shall be pleased to give him full particulars.

Yours faithfully,

Mansfield. J. B. S. POYSER.

CLUB ANNOUNCEMENTS

The Society of Model and Experimental Engineers

On Thursday, September 22nd, at 7 p.m., Mr. J. C. Crebbin will give his reminiscences to a meeting of the society at Caxton Hall, Westminster. "Uncle Jim" may be said to be one of the "Fathers" of model engineering in this country, being one of the founders of the society. During half a century he has met most of the outstanding personalities of the model engineering world, and his talk should prove of great interest to those of a younger generation. He has recently returned from a tour in Scandinavia, and will have much to tell of engineering developments there.

Many readers will be sorry to learn of the recent decease of Mr. S. W. Simpson, of Brentwood. This outstanding member of the model engineering world was the sponsor of the well-known and popular annual event "Simpson's Day," which gave much pleasure to many a locomotive enthusiast and countless children. His passing will be keenly felt.

The annual dinner of the society will be held at the Tavistock Restaurant, Charing Cross Road, W.C., on October 31st next. Tickets and information may be obtained from J. Davies, 78, Dacres Road, Forest Hill, S.E.26, or from the Hon. Secretary, A. B. STORRAR, 67, Station Road, West Wickham, Kent. Springpark 3027.

South London Model Engineering Society

The third annual locomotive trials will be held on Sunday, September 25th, at Dog Kennel Hill, East Dulwich, S.E., starting at 12 noon.

Track for 2½-in., 3½-in. and 5-in. gauge locomotives will be available and all clubs as well as 'lone hands" are cordially invited to bring a locomotive and compete for the South London Cup and be our guests at a sit-down tea in the afternoon.

Hon. Secretary: W. R. COOK, 103, Engleheart Road, Catford, S.E.6.

Cape Town Society of Model and Experimental Engineers

The Cape Town Society of Model and Experimental Engineers recently held its 39th annual general meeting, at which the following office bearers were elected:—

President, R. F. Chapman; Vice-president, R. W. Ellis; Hon. Secretary, A. J. Cooke; Hon. Treasurer, A. G. MacMahon; Committee, E. Rowbottom, E. Mitchley, H. De Gruchy, E. W. Osborn, R. J. A. Wintle and A. Baker.

Visitors to Cape Town who are interested in model making should communicate with the Hon. Secretary, A. J. COOKE, P.O. Box 2430, Cape Town, S.A.

Eltham and District Locomotive Society

The next meeting will take place at the Beehive Hotel, Eltham, on Thursday, October 6th, at 7.30 p.m., and will be a general discussion night. Members are invited to discuss any topics in which they are interested.

At the last meeting, Mr. Hutton brought along the chassis of his locomotive and gave a talk concerning the construction. This most beautiful piece of craftsmanship was greatly admired and earned warmest thanks to Mr. Hutton for a very interesting evening.

As the permanent track is not quite finished, it was decided to defer the official opening until next year, when local clubs will be invited to attend. Visitors are always welcomed to attend the meetings.

Hon. Secretary: F. H. BRADFORD, 18, South Park Crescent, Catford, S.E.6.

Malden and District Society of Model Engineers

The above society's autumn exhibition is being held this year on October 27th, 28th and 29th, at the Richmond Community Centre, Queens Hall, Sheen Road, Richmond. The "Malden Medal of Merit" will again be awarded for outstanding craftsmanship, and members of other clubs and all "lone hands" are invited to enter this competition section. The closing date for receiving entry forms is October 10th.

Entry forms and full particulars of the exhibition are obtainable from the Hon. Social Secretary, S. W. STEVENS-STRATTEN, 3, Coombe Gardens, New Malden, Surrey.

Ickenham and District Society of Model Engineers

The following programme has been fixed for the entertainment of our members, visitors and prospective new members interested in "Live Steam" smaller gauges, and we are still looking for those who prefer boats.

September 30th. Annual General Meeting.
October 7th. "Gauge 'OO' and its Headaches."
October 14th. Model Judging, Members' Work.
October 21st. Discussion Night.
October 28th. "Camera Progress from Early Types to Modern Miniatures."

Similar programmes are being arranged to cover each month until the Spring, when our track for 3½-in. and 5-in. gauges will be brought into use again. We are now thoroughly organised to create interest and entertainment to all branches of model work, and look forward to increasing our membership. Why not come along you "lone hands," you will be warmly welcomed!

Hon. Secretary: H. C. PIGGOTT, "Chatsworth," 23A, Parkfield Road, Ickenham.

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Readers desiring to see the Editor personally can only do so by making an appointment in advance.

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